The Bittersweet Century:
Slavery, tariffs and Brazilian export growth during the nineteenth century

Christopher David Absell

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Antonio Tena-Junguito

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For Greta,

And in memory of my mother, Elizabeth.

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ABSTRACT

This dissertation revises the veracity of the official statistics and conventional narrative of Brazil's export performance during the nineteenth century. An accuracy test reveals that the official export series is undervalued. When corrected using international prices, post-independence (1822-1850) export growth is found to be the most dynamic of the century. This dynamism was driven by the rapid growth of coffee exports in the southeast and the revival of sugar exports in the northeast. The first part of the dissertation posits that Brazil's dynamic post-independence export performance was associated with exogenous institutional change that improved Brazilian competitiveness in international markets, specifically British West Indies slave emancipation. The second part of the dissertation tests the emancipation hypothesis. Results indicate that, for the case of sugar, British slave emancipation served to increase the demand for Brazilian sugar in the British market. Increased demand was due to two British policy interventions. Initially, the premature end to the system of apprenticeship in the West Indies in 1838 corresponded with increased imports of Brazilian sugar, much of it destined to the British re-export market. The reduction of duties on non-colonial sugar in 1846, together with declining supplies from the British West Indies, led to rapidly increasing quantities of Brazilian sugar retained for consumption. I estimate that the British policy interventions contributed to an increase in Brazil's market share of five per cent. Given the size of the British sugar market, however, this corresponded to around 15 to 28 per cent of the volume of Brazil's exports. A comparison with other markets indicates that these trends were largely confined to the British sugar market. For the case of coffee, the determinant of the rapid growth of coffee exports is found to be the reduction and abolition in 1832 of the tariff on coffee in the United States. The consequent fall in the duty-paid price led to a rapid increase in consumption and the expansion of the potential of the American coffee market. In less than a decade, the United States became the principal consumer of coffee exports from Rio de Janeiro, and Brazil became the leading supplier of coffee to the American market. I estimate that the reduction and abolition of the American tariff on coffee is associated with an increase of around one-third in the volume of coffee exports from the port of Rio de Janeiro. Given that the cultivation of coffee was dependent on the exploitation of African slave labour, I also find that the reduction and abolition of the tariff corresponded to an increase of one-quarter in the number of African slaves imported to the southeast during the 1830s. Overall, the results of this dissertation represent an important re-interpretation of the determinants of Brazilian export growth during the post-independence period.

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Introduction

In 1902, amid a crisis of overproduction and plummeting world prices, the Excelentíssimo Señor General Quintino Bocayuva, President of the State of Rio de Janeiro, bitterly reminisced on the euphoria of the late-nineteenth century coffee boom. 'Habitual negligence' and 'natural unconcern' had diverted great amounts of capital and distracted the ambitions of even the most 'balanced' minds in a speculative frenzy, the bust of which no one supposedly saw coming. Corn, rice and beans were substituted for coffee. Grand palaces were constructed; traditional customs degenerated into 'game and other elegant vices.' In 1892, the year after the bubble burst in the Rio Stock Market, coffee occupied three quarters of the value of Brazil's total exports. Around the same time, Brazil held 60 per cent of the world coffee market, a figure that would ascend to 80 per cent on the eve of the First World War.[1] During the second-half of the nineteenth century, the coffee boom profoundly altered the physical and social landscape of the Brazilian southeast. Among the multitude of consequences, its fruit yielded the expansion of the railway network, proto-industrialisation, irremediable deforestation and post-emancipation mass immigration from Europe.[2] Indeed, as Bocayuva exclaimed, ironically reciting the motto of the times, 'O café dá para tudo!'[3]

[1] For an explanation of the sources for the trade series used in this section, see 'Brazilian Export Growth.'
[2] An overview of the contribution of exports to the Brazilian economy is given in Absell and Tena-Junguito, 'Brazilian export economy.' On the railways, see Summerhill, *Order*. On coffee and industrialisation, Dean, *Industrialization*; Silva, *Expansão*. On immigration, Holloway, *Immigrants*; Klein, 'European.' On deforestation, Dean, *Broadax*, Ch. 8.
[3] Rio de Janeiro, *Mensagem*, p. 43. Bocayuva's policy proposals later formed the basis of the valorisation plan. Delfim Netto, *Problema*, pp. 43-44; Taunay, *Pequena*, pp. 282-283.

Bocayuva's retrospective critique of the bearish mentality in the southeast during the final quarter of the century serves as a bookend to the rollercoaster ride that ended in the almost complete domination by Brazil of the world market for a single commodity. In the year of Brazil's independence, 1822, the country exported just over 11 thousand tonnes of coffee. In 1909, exports reached a ninety-year peak of over one million tonnes. During the decade in which Bocayuva wrote, Brazilian production alone closely fulfilled or even exceeded world consumption.[4] Nothing seemed to stymie its expansion. Coffee had not only survived but flourished after the mid-century closure of the slave trade and eventual emancipation of slavery in 1888.[5] It fled the hinterland of Rio de Janeiro from creeping erosion and soil exhaustion into the Vale do Paraíba, bifurcating into São Paulo and the southern frontier zone of Minas Gerais.[6] Exports remained unscathed by the fall of the Empire, heralding of the Republic in 1889, and accompanying *encilhamento*.[7] Not even the price bust that followed the boom of the 1890s would stem supply, as market disequilibria were further distorted by government intervention.[8] Brazilian coffee was too big to fail.

'Brazil era efetivamente, e só, o café:'[9] while the southeastern coffee industry experienced its *belle époque,* the country's other traditional exports were in a state of decline. Cotton exports from Maranhão, Pernambuco, Ceará and Alagóas, despite a brief revival during the American Civil War, at best stagnated from mid-century to 1913. Tobacco, cacao, hides and other animal by-products, aguardente, rice, farinha de

[4] Delfim Netto estimated turn of the century world consumption at 16 million sacks, or 960 thousand tonnes. Delfim Netto, *Problema*, p. 51. During the period 1901 to 1913, the volume of total Brazilian coffee exports averaged 80 per cent of this consumption estimate, minimum of 61 per cent (1910), maximum of 106 per cent (1909).
[5] See Klein and Luna, *Slavery*; Corrêa do Lago, *Escravidão*.
[6] On coffee's geographical expansion in Rio de Janeiro: Prado Júnior, *História*, pp. 161-166; Salles, *Vale*, 139-141. For its expansion in São Paulo, Milliet, *Roteiro*, pp. 17-27. For Minas Gerais, Corrêa do Lago, *Escravidão*, pp. 204-210.
[7] On the *encilhamento*, see Peláez and Suzigan, *História*; Triner and Wandschneider, 'Baring Crisis.'
[8] Holloway, *Brazilian Coffee*; Hutchinson, 'Coffee.'
[9] Prado Júnior, *História*, p. 167.

mandioca (cassava), tatagiba and coconuts remained marginal export industries. The Amazonian rubber boom was ephemeral.[10] Sugar cane, Brazil's most enduring colonial export product, was in a state of severe depression. The southeastern sugar cane industry had long been displaced by coffee. Sugar exports from the northeastern provinces of Bahia, Pernambuco and Sergipe declined in absolute and relative terms as producers exited the industry. In 1881, Brazilian engineer Henrique Augusto Milet addressed the stagnation of sugar production in Pernambuco, arguing that 'Today, as in 1876 and 1878, for the majority of our millowners, the price of their product obtained in the largest consuming markets … does not cover their costs of production…'[11] Indeed, from the late-1870s, prices reached century-long lows, exports violently contracted, and Brazilian sugar all but disappeared from the country's export composition. What once had been the world's leading sugar supplier, a 'small empire,' a 'commonwealth within itself,' by the turn of the century occupied less than two per cent of the world market.[12]

For Alexandre Góes, writing for the Bahian sugar conference of 1902, the explanation for Brazilian sugar's relative decline was as clear as day: '…cane farming is in crisis for a cause analogous to that of coffee – overproduction. But, in this case, an important distinction must be made: the coffee crisis was the result of Brazilian overproduction … in the case of sugar, overproduction has a European origin.'[13] Antonio Gomes do Mattos provided a clear prognosis, and solution, to the problem when he argued that the aim should be 'To try to reduce the cost of cultivation and manufacturing, in order to reduce the price of sugar, and withstand the competition from beet sugar...'[14] What's more, for Góes, the sources of the competitiveness of beet sugar were clear: its

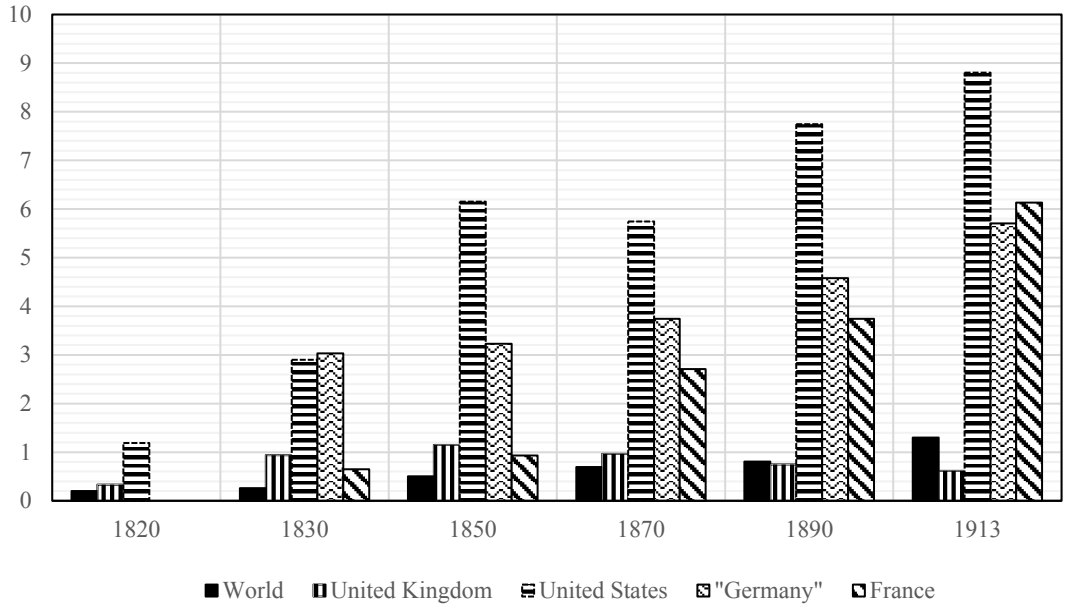
[10] Dean, *Brazil*; Fernandes, 'Stretching.'
[11] Milet, *A Lavoura*, pp. VII-VIII.
[12] Hutchinson, 'Transformation,' p. 205; Schwartz, 'Commonwealth.'
[13] Góes, *Considerações*, p. 64.
[14] From Antonio Gomes do Mattos, *Esboço de um Manual para os Fazendeiros de Assucar no Brazil*, 1882, cited in *ibíd.*, p. 10.

substitution of cane was not due to its superior extraction ratio, but rather '…because its industry is completely artificial, that is, supported by government with different types of incentives, protected by the European scientific and industrial community....'[15]

The Brazilian export economy generated instability not only because of extreme supply-side concentration in a single export commodity, but also because of its increasing demand-side dependence on the vicissitudes of Anglo-American consumption. While the nineteenth century witnessed the rapid expansion of the consumption of both commodities, the United Kingdom – the sugar 'emporium of the world' – and the United States – 'the world's greatest coffee market' – led per capita consumption for cane sugar and coffee, respectively, by a considerable margin.[16] Figure 1.1 provides details of per capita consumption trends, both for the 'world' and for Brazil's principal trading partners.[17] From 1823 to 1913 total world coffee consumption increased by a factor of 11 and sugar by an astounding factor of 44. Sugar was clearly the more important crop, shifting close to 40 billion pounds of beet and cane varieties in 1913, equivalent to an average of 22.2 pounds per capita. By these standards, the consumption of coffee was minuscule, reaching just over two billion pounds in the same period, 1.3 pounds per capita.

Consumption trends played a key role in defining the export performance of each commodity. Changing consumption patterns and the growth of real wages associated with industrialisation increased demand in Europe and the United States. Both sugar and coffee

[15] *Ibid.*, p. 21.
[16] United Kingdom, *Parliamentary*, p. 696; McDonald and Topik, 'Americanizing,' p. 118.
[17] The 'world' consumption per capita is based on sketchy world production and sketchy world population data. So, the reader must bear the assumption that production was equivalent to consumption for the benchmark years in question. Also, obviously not everybody in the world consumed sugar and coffee, although this figure can be used as a ball-park average consumption figure.



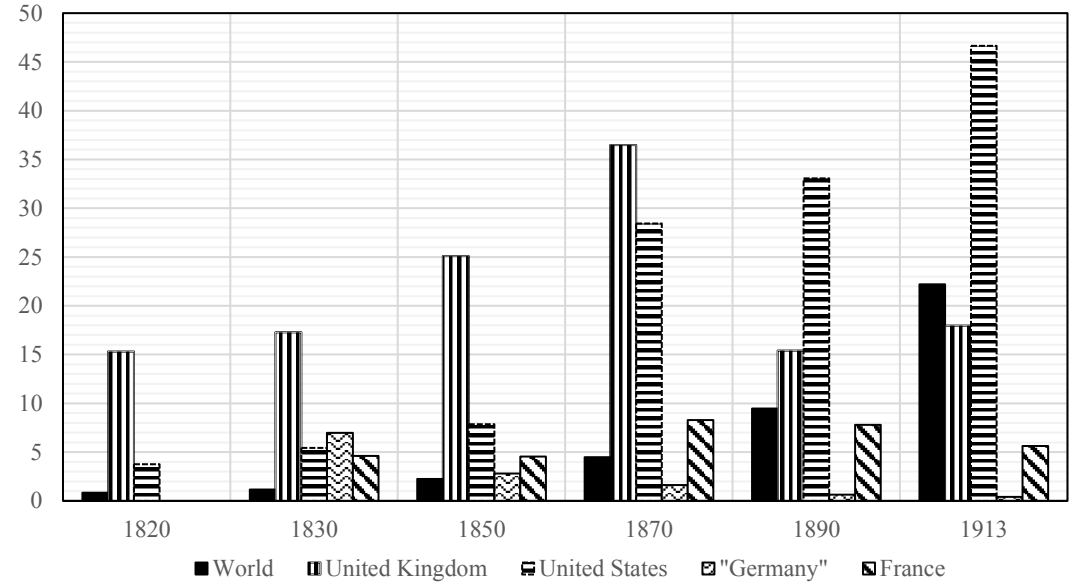


Figure 1.1. *Per-capita consumption in pounds (lbs) of coffee (above) and unrefined cane sugar (below), world and various countries, 1820-1913*

Notes: Full series p. 239. Figures for US are for brown sugar only, the UK for cane sugar where possible, France for all types of unrefined minus beet and local production, and for Germany as for France. Germany 1830 and 1850 is Hamburg. France and Germany 1830 is 1831; France 1870 is 1867; Germany sugar 1913 is 1911; world coffee 1820 is 1823 and 1913 is 1910. World population estimates for 1830 and 1890 are interpolated. *Sources*: Population: Bolt et al., *Maddison*. World production, coffee and sugar: see appendix 2.1. Coffee and sugar retained for consumption: United Kingdom: *Tables*; United Kingdom, *Annual statement*; United Kingdom, *Statistical abstract*. United States: *Commerce and Navigation*. France: *Tableau*; France, *Annuaire statistique*. "Germany:" Hamburg, *Tabellarische*; Germany, *Statistisches*.

became objects of mass consumption in these markets. The United States led the rise in the consumption of coffee, moving from 1.2 to 8.8 pounds per capita between 1820 and 1913.[18] In Europe, trends in French and German per capita consumption were not far behind those of the United States.[19] British consumption of coffee, after experiencing a rise during Brazil's post-independence period, fell off after mid-century, possibly due to the abolition of slavery in the British West Indies and a tariff regime that favoured tea, a popular substitute for coffee since the eighteenth century.[20] Until the 1870s, the United Kingdom was the leading consumer of unrefined cane sugar, consuming around ten times the 'world' per capita average, although, during the second half of the century, this consumption would decrease in favour of beet varieties. The same was true for both France and Germany, the two most important European beet producers. The only country that did not experience a decline in per capita consumption of cane was the United States, which at the end of the period consumed 46.6 pounds per capita, over twice the 'world' average.

The concentration of Brazil's exports of coffee and cane sugar followed these consumption trends. During the first decade of Brazil's independence, only 12 per cent of the volume of Brazil's total exports of coffee was destined to the east coast of the United States. By 1870, however, Americans were consuming over half of Brazil's coffee, a trend that would largely remain constant until the First World War. On the other hand, the United Kingdom's share of Brazilian cane sugar rose from around 20 per cent in the early-1840s, to over half of exports in the 1870s. In 1913, the British market absorbed 90 per cent of the northeast's rapidly declining output. Together, these two

[18] On the mass consumption of coffee in the US, see Topik and Samper, 'Latin American coffee commodity chain,' pp. 133-139; McDonald and Topik, 'Americanizing.'
[19] For a comprehensive review of turn of the century per capita consumption estimates and imports, see Graham, *Coffee*, pp. 102-118.
[20] Smith, 'Accounting,' pp. 196-201; 'Sugar's poor relation,' p. 74.

markets occupied 47 per cent of the total value of Brazil's exports.[21] While the export economy may have been the 'motor' of Brazilian economic growth during the nineteenth century, Anglo-American demand was its lubricant.[22]

ARGUMENT

To understand the roots of the export crisis and the external dependency of the late-nineteenth century Brazilian export economy, one must travel back in time to the immediate post-independence period. Like the United States' case, the 1830s and 1840s represent a formative, and understudied, period in the development of Brazil's export economy.[23] Of course, seventy years prior to Bocayuva's bitterly nostalgic episode, Brazil was a very different country. Fresh from political independence ten years before, the country was rife with political unrest. Pedro I, the Empire's monarch, after unilaterally decreeing the closure of the Brazilian slave trade, had recently abdicated and returned to Portugal, leaving a five-year-old son successor and a group of regents to balance burgeoning separatist sentiment and claims for regional autonomy. Coffee was an emerging export commodity, rivalling cane sugar for dominance in Brazil's export composition. This was the eve of a profound shift in Brazil's economy. It was during this decade, the Regency era, that southeastern coffee would experience its vertiginous take-off, and that northeastern cane sugar would begin its brief mid-century revival. It was also during this period that Brazilian exports began their concentration in Anglo-American markets: coffee skewed towards the American market in the 1830s, and cane sugar towards the British market in the 1840s.

[21] Including Germany, this figure rises to 60 per cent. Brazil, *Commercio Exterior*, p. XXXV.
[22] Leff, 'Tropical Trade,' p. 690.
[23] Williamson, 'International Trade.'

When revising this period of Brazilian history, one is immediately confronted with important lacunae and contradictions in the narrative of the country's post-independence growth experience. The first, and perhaps most important, is the apparent contradiction between the conventional narrative of export growth and the empirical work on alternative indicators of economic dynamism during the late-colonial and post-independence period. According to the conventional narrative, the Brazilian economy stagnated during the first few decades of its independence, export growth was a post-mid-century phenomenon, and this growth performance was synonymous with the rise of coffee cultivation in São Paulo. Growth in nineteenth century Brazil '…came late and in diluted form,'[24] the principal cause of this being '… the stagnation of exports.'[25] For Caio Prado Júnior, '…the economic, financial, political, and social crisis that unfolded in Brazil from the moment the Portuguese court was transferred in 1808 …was prolonged until mid-century … and while it is true that before this point the seeds of transformation were already being laid, it was only afterwards that they matured and produced the fruit that would so profoundly modify the conditions of the country.'[26]

Over the past few decades, however, a wealth of empirical work has been undertaken on the post-independence period, and the impression derived from this body contradicts the pessimistic account. Comparative work on the institutional trajectories of the newly independent Latin American economies has highlighted Brazil's early exceptionalism.[27] As Stephen Haber and Herbert Klein observed, 'Brazilian independence was relatively bloodless, there was little destruction of physical capital or capital flight, and the same royal family that ruled Brazil during the colonial period

[24] Fishlow, 'Brazilian Development,' p. 102.
[25] Furtado, *Formación*, p. 114.
[26] Prado Júnior, *História*, p. 192.
[27] Prado de la Escosura, 'Lost decades;' Dye, 'Institutional Framework;' Federico and Tena-Junguito, 'American divergence.'

continued to do so for nearly 70 years afterwards.'[28] In contrast to the experiences of many Spanish American republics, Brazilian state building involved an uninterrupted process of political centralisation. One consequence of this process, highlighted by William Summerhill, was the remarkable stability of the country's creditworthiness in London.[29] Another consequence was the expansion of urban and rural economic activity, driven to a large degree by the increase in supply of African slave labour. Thus, despite the *de jure* abolition of the slave trade in 1831, the volume of African slaves arriving to Brazil peaked during the 1830s.[30] In Bahia and Pernambuco, a record number of sugar mills were constructed during the 30 years following independence.[31] Notwithstanding uncongenial geography and limiting transportation networks, coffee farming rapidly spread into the interior of Rio de Janeiro and São Paulo. Ricardo Salles described the period 1836 to 1850 in Vassouras as '…the highest moment of power and wealth of the great slave- and land-owning families...'[32] As Zephyr Frank observed, the rate of wealth creation in the southeast during the expansion of coffee cultivation most likely rivalled that of the United States during the same period.[33] While it is true that certain sectors of the Brazilian economy - most notably the northeastern cotton industry[34] - suffered from stagnation and relative decline during the early decades of the independent Empire, the overall picture is not one of a 'sleeping giant,' but rather of a sophisticated pattern of coastal cities linking a rapidly expanding agricultural frontier to each other and to the international market.

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[28] Haber and Klein, 'Economic consequences,' p. 243.
[29] Summerhill, *Inglorious Revolution*.
[30] Klein, *Atlantic*.
[31] Eisenberg, *Sugar Industry*, p. 124; Barickman, *Bahian Counterpoint*, p. 36.
[32] Salles, *Vale*, p. 151.
[33] Frank, 'Wealth Holding,' p. 247. See also the discussion of Rio de Janeiro in Frank, *Dutra's World*, Chap. 5.
[34] For the case of Maranhão, see Pereira, 'Cotton Trade,' Chap. 5.

The contradiction between stories of export stagnation and economic dynamism essentially reflects a fundamental difference in the treatment of sources. Most stylised accounts of Brazilian export growth rely on official statistics, intermittently elaborated and published by the Brazilian government during the nineteenth century and later compiled by the Instituto Brasileiro de Geografia e Estatística, while the empirical work underscoring the dynamism of the post-independence period has used alternative historical sources, such as post-mortem inventories, consular reports, newspapers, censuses and other archival material. In the latter case, historical interpretations are almost always contingent on the representativeness and reliability (or, at least, comparability) of the primary sources used. Sadly, the same cannot be said of Brazil's official statistics. Despite the centrality of the export economy in the narrative of Brazil's long-run economic development, and the centrality of the official export statistics in our understanding of the export growth dynamic, few scholars have tested the veracity of the official series.[35] Thus, the first step in revising the historical narrative of Brazil's export performance during the post-independence period is to stop and ask: Are the official statistics accurate?

The first paper of the dissertation addresses this question by constructing a price accuracy index for the official export series for the period 1821-1913. The main finding is that Brazil's official export statistics were undervalued, most likely due to the reliance on official prices that differed considerably from market prices. Once corrected using a weighted average of international prices, the post-independence period to mid-century is shown to be the most dynamic in terms of export growth. The robustness of this finding, as well as the accuracy of the import series, are tested in the second paper. Alongside

[35] Exceptions include Wileman, *Brazilian Exchange*; Corrêa do Lago, 'Balança;' *O comércio exterior*; Franco, 'O balanço;' 'Setor externo.'

evidence of the undervaluation of the official import series, post-independence dynamism is shown to be robust to changes in the assumptions underlying the reconstruction of the export series. It is argued that this dynamism was related to an exogenous institutional shock that came in the form of British slave emancipation and that afforded Brazil a competitive advantage over other tropical producers of cane sugar and coffee.

The third paper, 'British slave emancipation and the demand for Brazilian sugar,' tests the emancipation hypothesis for the case of northeastern sugar exports. Generally, the historiography is more attentive to the crisis that devastated the sugar industry in the final quarter of the nineteenth century than its growth beforehand. Central to the explanation of the crisis of northeastern sugar is the idea that Brazilian sugar was largely unprofitable.[36] The sources of unprofitability were to be found in steadily declining prices, themselves driven, at first, by a cost-competitive rival, Cuba, and later by a subsidised substitute, European beet sugar.[37] Attempts to increase productivity, through the adoption of Cayenne cane, the burning of bagasse (cane trash), and the introduction of horizontal presses and steam engines in the mills, '…were not enough to ensure competitiveness in the world market.'[38] Heightened credit constraints due to the underdevelopment of financial institutions and rudimentary transportation networks, major barriers to northeastern productivity gains, were eventually overcome, on the other hand, by Cuban planters.

Still, as mentioned previously, during the post-independence period the investment in mills increased and exports rose to historically unprecedented levels. One

[36] Eisenberg, *Sugar Industry*, p. 227; Barickman, 'Persistence,' p. 589; Ridings, *Business interest groups*, pp. 98-99.
[37] An estimate from a British consul report of 1848 for production costs in São Paulo and Bahia was 14 shillings per hundredweight. If accurate, this suggests that sugar producers began consistently producing at a loss from the late-1830s onwards. United Kingdom, *Copies*, pp. 63-66, 428-452.
[38] Barickman, *Bahian Counterpoint*, p. 176.

is thus confronted with an apparent paradox in the literature, whereby production was expanding at the very time when the industry was becoming increasingly unprofitable. The standard explanation for the growth-without-profit paradox is that improved external conditions temporarily offset the loss of competitiveness derived from lagging productivity. Improved conditions, in the main, are attributed to the liberalisation of the British market as the result of political pressures generated from slave emancipation in the West Indies, although the decline of Saint Domingue and increased access to the German Customs Union also contributed, at different times, to the revival of exports.[39] As the voluminous body of work on British slave emancipation has shown, emancipation in the West Indies resulted in the decline of exports from the British colonies, a rapid increase in the price of sugar in Great Britain, and a temporary decline in consumption.[40] The consequent reduction of the tariff on non-colonial sugar after 1846 was also shown to be associated with the rapid increase of slave-grown sugar from the Spanish West Indies and Brazil.[41] This body of work, however, does not provide a concise account of the effect of slave emancipation on non-colonial countries. On the Brazilian side, the literature on Anglo-Brazilian relations has remained focused on the various facets of British economic penetration and political meddling in Brazil, from the concessions derived from the recognition of Brazilian independence to the British role in both the financing and abolition of the slave trade, as well as British capital's role in the expansion of the export economy.[42] Absent from this literature is a rigorous empirical study on the effect of British slave emancipation on Brazilian sugar exports.[43] The third paper thus poses the question: What was the precise impact of the British policies associated with

[39] Klein and Luna, *Slavery*, p. 79; Barickman, *Bahian Counterpoint*, p. 38; Curtain, 'British Sugar Duties.'
[40] Green, *British Slave Emancipation*; Drescher, *Mighty Experiment*.
[41] Curtain, 'British Sugar Duties.'
[42] Manchester, *British Preëminence*; Bethell, *Abolition*; Graham, *Britain*.
[43] A first step in this regard is Batista Jr., 'Política tarifária.'

West Indies slave emancipation on the growth of sugar exports from the Brazilian northeast?

Using standard intervention analysis methodology and monthly data on sugar imports in Liverpool and New York, I find that the British policies surrounding emancipation were associated with a rapid increase in the demand for Brazilian sugar in the British market. Short-run positive effects were particularly large following the end of apprenticeship in the British colonies in 1838 and the passage of the Sugar Act in 1846 and subsequent reduction of the tariff on non-colonial muscovado sugar. The long-run effect takes the form of a market share increase for Brazil of around five per cent, which, given the size of the British market for sugar, corresponded to between 15 and 28 per cent of the volume of Brazilian exports. One consequence of these events was the rapid concentration of Brazil's sugar exports in the British market. Outside of the British market, demand for Brazilian sugar was stagnant or declining, due to the rise of European beet sugar production and Cuban competition in the American market. The case of coffee, however, is different. Although the events surrounding British slave emancipation undoubtedly provided a fillip to Brazilian coffee exports by temporarily opening space to non-colonial product in both the re-export and retained for consumption markets, the British market for coffee was too small to fuel the export boom that was taking place in the Brazilian southeast.

Conventional explanations of the rise of coffee have implicitly reflected a Ricardian-type comparative advantage narrative, whereby the southeast's specialisation in coffee was the result of lower unit costs. In Celso Furtado's seminal formulation,

> 'The coffee enterprise permitted intensive utilization of slave manpower, being similar in this way to the sugar economy. It did, however, entail a much lower degree of capitalization inasmuch as utilization of the land factor was more important. Capital was

> fixed, the coffee plantation being a permanent form of cultivation, and the monetary needs for replacement were much smaller than in the sugar economy, since the equipment used was simpler and, more often than not, of local manufacture. Organized on the basis of slave manpower, the coffee enterprise enjoyed monetary costs still lower than those of the sugar undertakings.'[44]

Since Furtado, the empirical literature on the expansion of coffee cultivation in the Vale do Paraíba has largely confirmed the agricultural efficiency thesis. This literature has shown that the fixed and variable cost structure of coffee and sugar production differed in important ways that made coffee production attractive when relative prices shifted in favour of the latter. Besides investment in land and labour needed for cultivation, milling also required investments in rudimentary technology for cane juice extraction, evaporation, and crystallisation, processes that demanded additional slave labour.[45] Coffee, on the other hand, did not require such a large fixed investment. For coffee, marginal investment was required in the hulling process, using large wooden pestles – o *monjollos* – but this process could also be accomplished with the use of sticks.[46] Other variable costs were also important for the shift to coffee. The evaporation of water from cane juice required prodigious quantities of wood fuel, which demanded a considerable investment in labour and time to acquire. Slaves had to be engaged to clear the forests, and transportation had to be arranged to ensure a steady stream of fuel to the mill. Not until planters adopted the habit of burning bagasse did the dependency on wood fuel decrease.[47] Additionally, transport costs were high for both products. This being before the arrival of the railroads, final product was transported by mules. The innate qualities

[44] Furtado, *Formación*, p. 121.
[45] For the evolution of coffee and sugar cultivation in São Paulo, see Petrone, *Lavoura*; Marcondes, *Arte*; Luna and Klein, *Slavery and the Economy*.
[46] Ferreira de Aguiar, *Pequena*; Marquese, 'Paisaje;' Stein, *Vassouras*, pp. 21-38.
[47] Miller, 'Fuelwood,' p. 183; Dean, *Broadax*, pp. 176-177.

of sugar, however, made it more liable to damage than coffee. Humidity or rainfall could easily soil both the wooden boxes that transported sugar and their load, reducing the quality of the product that arrived at the port.[48]

While the cost structure of both products was important, price trends are fundamental for explaining why coffee grew when it did. Of course, prices and demand-side conditions factor into most restatements of the agricultural efficiency thesis, although explanations of the periodicity of the coffee boom are remarkably vague. Coffee '…benefited from propitious external conditions…'[49] that included '…the elimination of Saint Domingue and the post-1815 rise in European and North American demand that sent prices rising,'[50] while the market for sugar '…became less promising day by day.'[51] For both commodities, prices declined considerably over the first half of the nineteenth century. Figure 1.2 displays the unweighted average of monthly price quotations of coffee and brown sugar in four leading consumer markets (Amsterdam, Hamburg, Liverpool and New York), together with local prices quoted in Rio de Janeiro. Price declines were more abrupt for coffee than for cane sugar: the average international price of coffee dropped from around 160 shillings per hundredweight in the final quarter of 1818 to just under 40 in early-1849, while that of sugar declined from around 70 to 20 in the same period. Price trends across consuming markets, apart from the period of British slave emancipation, were similar, and the gap between prices in foreign markets and in Rio de Janeiro gradually declined for both commodities, indicating a slow process of convergence. In Rio de Janeiro, prices shifted in favour of coffee from the late-1820s, suggesting a higher rate of profitability.

[48] Petrone, *Lavoura*; Momsen Jr., 'Routes;' Nogueira de Matos, 'Evolução.'
[49] Marcondes, *Arte*, p. 47.
[50] Klein and Luna, *Slavery*, p. 91.
[51] Furtado, *Formación*, p. 118.

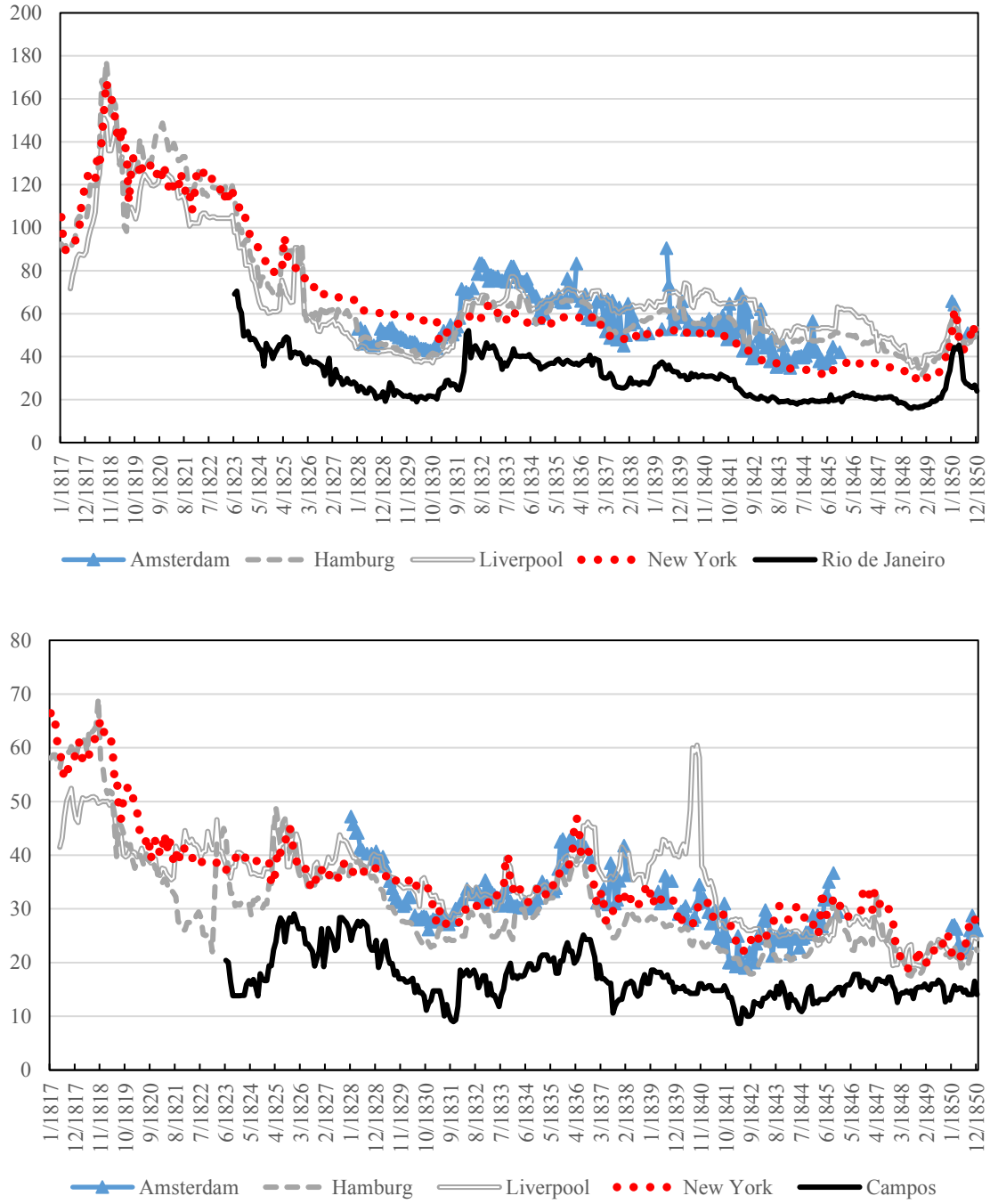

Figure 1.2. *Average monthly prices of coffee (above) and brown sugar (below) for five markets, in shillings per hundredweight, 1/1817-12/1850*

Notes: Full series p. 240. This figure displays the unweighted average of monthly price quotations of each commodity in each market. Prices are included in bond. The country composition of each index is given in appendix 1.1. Campos represents the series for muscovado sugar. Rio de Janeiro represents the arithmetic average of ord, boa and superior varieties. Prices and weights in Rio de Janeiro, Campos, Amsterdam, Hamburg and New York have been converted to shillings per hundredweight to permit comparability. Exchange rates are taken from Denzel, *Handbook*. *Sources*: Amsterdam: *Börsen-Halle*, *Handelsblad* and *Nieuw Rotterdamsche Courant*. Campos and Rio de Janeiro: *Semanario Mercantil*, *Diario Mercantil*, *Jornal do Commercio*, *Diario de Rio de Janeiro*, *Rio Mercantile Journal*, *Correio Mercantil*. Hamburg: *Börsen-Halle*. Liverpool: *Liverpool Mercury*, *The Manchester Times and Gazette*, *North Wales Chronicle*. New York: *Shipping and Commercial List and New-York Price Current*.

Recent work, connecting events in the international market for coffee with the spread of cultivation in the Vale do Paraíba, has highlighted the importance of the rapid rise of consumption in the United States during the first half of the nineteenth century. According to Steven Topik, 'Coffee became truly a mass product for the first time in the United States.'[52] This was the result of several factors, including favourable tariff policy, temperance movements, northern European immigration, and marketing campaigns that fed on American nationalism.[53] Topik argued that 'supply-induced demand,' whereby 'Cheap fertile land and slave labor allowed coffee prices to plummet after 1820 and remain low until the last quarter of the century…', was a key aspect of expanding American consumption.[54] For other scholars, shifts in American tariff policy, particularly the abolition of the coffee duty in 1832, were decisive, as they '…permitted the reduction by half of the price of coffee...'[55] '…a rate that brought the price of a cup of coffee down to the price of a glass of whiskey punch…'[56] The shift in American consumption exerted a profound effect on the Brazilian southeast: 'More coffee consumption in the United States … meant larger numbers of slaves illegally carried from Africa to Brazil…'[57] and produced '… scores of 'coffee barons' and slave baronies in Brazil.'[58] This account, however, remains largely qualitative and, given the importance of the rise of coffee for Brazil's long-run development, deserves a rigorous answer. The question that the final paper of this dissertation, 'The rise of coffee in the Brazilian southeast: tariffs and foreign market potential, 1827-1840,' asks is: Was the shift in American tariff policy correlated with the growth of coffee exports from Rio de Janeiro?

[52] Topik, 'Integration,' p. 37.
[53] McDonald and Topik, 'Americanizing,' p. 121; Rorabaugh, *Alcoholic*, pp. 100-101.
[54] Topik, 'Integration,' p. 31.
[55] Marquese, 'Estados Unidos,' p. 55.
[56] Rorabaugh, *Alcoholic*, p. 100.
[57] Marques, *United States*, p. 122.
[58] McDonald and Topik, 'Americanizing,' p. 121.

The final paper argues that American tariff reform indeed had profound consequences for the growth of coffee in southeastern Brazil. Using monthly data on exports by destination from the port of Rio de Janeiro, imports by origin to New York and Liverpool, and prices in foreign markets, I show that the timing of the coffee boom coincided with the reduction and abolition of the tariff on coffee in the United States, and subsequent expansion of American coffee market potential. I estimate that American tariff reform increased the volume of coffee exports by around one-third and the number of slave imports to the port of Rio de Janeiro by one-quarter. This growth was associated with an increase in the participation of American and non-British firms in exports, all with indirect links to the contraband slave trade.

In sum, this dissertation argues that the post-independence period was the most dynamic of the century in terms of export growth. This dynamism was driven by the rise of coffee in the southeast and the revival of cane sugar in the northeast. The proximate cause of export growth during this period was the increased exploitation of land and African slave labour. The ultimate cause was exogenous institutional change in the international market for coffee and cane sugar. In the case of the latter, growth was associated with the events surrounding British slave emancipation, particularly the passage of the Sugar Act and reduction of the tariff on non-colonial muscovado sugar. In the case of coffee, British slave emancipation provided only a minor fillip. It was the reduction and abolition of the duty on coffee in the United States that permitted the rapid growth of coffee in the Brazilian southeast.

Part 1

Reconstruction

2

Brazilian export growth and divergence in the tropics during the nineteenth century

Abstract. The objective of this paper is to reappraise both the accuracy of the official export statistics and the narrative of Brazilian export growth during the period immediately following independence. We undertake an accuracy test of the official values of Brazilian export statistics and find evidence of considerable under-valuation. Once corrected, during the post-independence decades (1822-1850) Brazil's current exports represented a larger share of its economy and its constant growth is found to be more dynamic than any other period of the nineteenth century. We posit that this dynamism was related to an exogenous institutional shock in the form of British West Indies slave emancipation that afforded Brazil a competitive advantage.

'The great *desideratum* of every student of national finance and economy must be a thorough and trustworthy compilation of the respective statistics, that, embracing a long period, will afford a safe basis on which to found deductions, without which all conclusions are little better than mere speculations.' J. P. Wileman[59]

Brazil's export sector is the focal point of much of the country's economic historiography. It has been described as the motor of the Brazilian economy during the nineteenth century.[60] For better or for worse, the export sector was the principal source of the productivity growth of the Brazilian economy. It was the magnet for the first waves of foreign capital investment, the initiator of railway expansion, and an important contributor to the government's coffers.[61] Furthermore, it defined Brazil's role in the world economy as a member of the primary product producing periphery during the first globalisation. For these reasons, much of the economic history of the country has been dedicated to the export sector, covering almost every conceivable aspect of its development. The country's export performance is a defining aspect of this history. Much of the historiography of this export performance has been based on an analysis of official Brazilian export statistics. Until now, however, the accuracy of these statistics has not been verified to a satisfactory extent. The objective of this paper is therefore to test the official Brazilian export statistics for their accuracy, utilising a methodology that has proven fruitful in other case studies. As we shall see, the official values of Brazilian export statistics demonstrate a bias that distorts our understanding of Brazil's export performance during the first half of the nineteenth century. When reappraised and put into comparative perspective, it becomes apparent that Brazilian export growth during the post-

[59] Wileman, *Brazilian Exchange*, p. 129.
[60] Leff, 'Tropical Trade,' p. 690.
[61] Abreu and Corrêa do Lago, 'Property rights;' Leff, 'Economic Development,' p. 35; Absell and Tena-Junguito, 'Brazilian export economy.'

independence decades was more dynamic than any other period of the nineteenth century.

These conclusions do not sit well with the traditional narrative of this period. Traditionally, economic historians have focused on the second half of the century, when Brazil entered a 'novo equilíbrio econômico' in which coffee in the southeast was the principal protagonist in the growth of the quantum and value of the country's exports. During the period from independence to mid-century, according to the traditional narrative, Brazil remained a stagnant, 'sleeping giant.'[62] Although the process of independence was not overwhelmingly detrimental to export growth, the first few decades of independence were described as being anything but dynamic. As classic studies by Caio Prado Júnior and Celso Furtado both indicated, this was largely due to the demise of the eighteenth-century gold rush and the stagnation and decadence of the previously dominant sugar and cotton export industries in the northeast of the country. Furthermore, according to this narrative, export growth was impeded by other factors including seemingly insurmountable internal trade costs, political and institutional instability, technological backwardness and the profound scarcity of factors of production.[63]

This traditional narrative has been taken to task by much of the empirical work on the Brazilian economy during this period. Amongst the first scholars to seriously '...check the relevance of the stylised facts...' was Nathaniel Leff, who argued that the second half of the century was not as dynamic as previous descriptive studies had claimed.[64] Furthermore, Leff's calculations revealed that export growth during the post-independence period was in fact more dynamic than the second half of the century.[65] Leff

[62] Meade, *Brief History*, p. 89; Baer, *Brazilian Economy*, pp. 16-18; Fishlow, 'Brazilian Development,' p. 102; Batista Jr., 'Política tarifária,' p. 204.
[63] Prado Júnior, *História,* pp. 192-204; Furtado, *Formación*, pp. 113-123. On the decline of gold and the cotton and sugar industries in the eighteenth century, see Simonsen, *Historia económica*.
[64] Leff, 'Technique,' p. 363. Leff used data on the currency stock, together with official export statistics, to estimate the long-run trend of income growth, estimating growth rates of 2.7 per cent from independence to 1869, 2.1 per cent from 1869 to 1894, and 4.3 per cent from 1895 to 1913.
[65] Leff, 'Tropical Trade,' Table 4, p. 683.

was primarily concerned with overall income growth, however, and his conclusions emphasised the importance of the regional disparity in export growth and its impact on the country's long-run income distribution.[66] What's more, his conclusions were based on the official trade statistics and, given Leff's recognition of the limitations of these statistics, were thus tentative. Leff's work has been complemented by a literature that, as we shall see in the following section, paints a more dynamic picture of the post-independence Brazilian economy.

While the traditional narrative has been thoroughly questioned by the subsequent work on Brazil's export economy, there remains the problem of the accuracy of the official statistics that serve as the basis of much of this work. Here we seek to lend quantitative support to this literature through the reconstruction and analysis of the country's export series. The paper is structured as follows. The next section outlines the literature on early Brazilian economic dynamism. The second section concerns the accuracy and reconstruction of Brazil's export statistics. The third section reappraises the country's export performance. Concentrating on the post-independence period, we then place this performance in comparative perspective and provide an empirical basis for the revisionist narrative. Based on an examination of the empirical evidence regarding comparative growth rates and export market shares in the tropical Americas, we posit that the abolition of slavery in the British West Indies provided Brazil a competitive advantage that incentivised producers to expand the country's factor endowment through the large scale importation of slaves and the expansion of the agricultural frontier. The final section concludes.

THE LITERATURE ON EARLY BRAZILIAN ECONOMIC DYNAMISM

Our results notwithstanding, there are other indications that Brazil's post-

[66] Leff, 'Economic Development and Regional Inequality.'

independence economy was much more dynamic than traditionally thought. Using alternative indicators of economic dynamism, the literature on this period has recast the Brazilian experience in a more dynamic and geographically disparate light. To begin with, Brazil was exceptional in the sense that it was not subjected to the political and institutional instability conventionally associated with the process of independence in Spanish America. As Leandro Prados de la Escosura noted, in the context of Latin American independence, Brazil provided '… a counterpoint of stability and gradual institutional transition while opening up to international commodity and factor markets.'[67] Unlike most of Spanish America, imperial collapse did not come with the baggage of balkanisation or anti-trade policy that characterised other countries of the region.[68] Furthermore, Brazil did not experience the institutional turmoil derived from slave abolition until much later in the century and only after suffering from a prolonged series of restrictions to its Atlantic slave trade.

While Brazil remained relatively free of the domestic institutional shocks associated with independence, institutional change plays an important role in the narrative of Brazil's early dynamism. As a number of scholars have argued, the aftermath of the Haitian Revolution and the institutional shock of slave emancipation in the British West Indies in 1834 effectively opened room for more competitive tropical agricultural producers.[69] The export economies of those countries that remained slave plantation economies, such as

[67] Prados de la Escosura, 'Lost Decades,' p. 281. Thus, Brazil forms an exception to the rule in what has come to be known as the lost decades argument. Also see Bates et al., 'Lost Decades,' p. 921; Dye, 'Institutional Framework.' Independence, however, has been recognised as a costly process in terms of the temporary loss of fiscal sovereignty due to the payment of indemnities to Portugal and the continuation of a tariff agreement with Great Britain. On the fiscal impact of independence, see Abreu and Corrêa do Lago, 'Property rights,' pp. 338-340. On the relationship between Brazil and Great Britain, see Haber and Klein, 'Economic Consequences,' pp. 245-248.

[68] However, Brazil was by no means immune from border disputes or secessionist revolts during the post-independence period. See Bulmer-Thomas, *Economic History,* p. 20.

[69] Leff, 'Tropical trade,' pp. 684-686; Klein and Luna, *Slavery*; Bulmer-Thomas, *Economic History of the Caribbean*, pp. 41-45, 169-178; Batista Jr., 'Política tarifária,' pp. 215-223. The slave trade was abolished by Great Britain in 1807. It wasn't until 1834, when the Slave Abolition Act of the previous year came into effect, that full emancipation occurred. On the British West Indies, see Sheridan, 'West Indian;' Ragatz, *Fall*; Ward, 'Profitability.'

Brazil, Cuba, Puerto Rico, and the Southern slave plantations of the United States expanded rapidly during the same period. Thus, while Brazil was not affected directly by domestic institutional shocks until later in the century, it was affected indirectly by institutional changes in the region. This is an important point to which we will return in section four.

Indications of Brazilian economic dynamism run parallel with the profound institutional changes taking place in the British West Indies. One such indicator is the prodigious number of slave arrivals during the post-independence period. The Atlantic slave trade, in the words of Herbert Klein and Francisco Vidal Luna, '...reached its peak in the third decade of the nineteenth century.'[70] Brazil was at the centre of this trade, drawing the major part of slave importations during the period between independence and the abolition of the Brazilian slave trade in 1850.[71] During the period from 1821 to 1830, more slaves were imported into Brazilian ports than any other destination during any decade in the recorded history of the Atlantic slave trade.[72] While the anti-slave trade law of 1831, the product of unyielding political pressure from the British, curtailed importations for a number of years, the trade continued and expanded considerably after 1837 until final abolition in 1850.[73] Although the ports in the southeast received the largest share of imports, a similar trend is observed in the northeast, effectively feeding the expansion of sugar plantations.[74] The demand for labour was apparently so high that a considerable rise in slave prices – which began in the late 1820s, seemingly in anticipation of abolition – did not curtail importations.[75] After 1850 and the banning of

[70] Klein and Luna, *Slavery*, p. 74.
[71] *ibid.,* pp. 78-79; Corrêa do Lago, 'O surgimento,' p. 329.
[72] See Klein, *Atlantic Slave Trade*, pp. 210-211, appendix Table A.2, which gives the following figures for Brazil (in thousands of slaves):1801-1810: 241.3, 1811-1820: 327.7, 1821-1830: 431.4, 1831-1840: 334.3, 1841-1850: 378.4, 1851-1860: 6.4.
[73] Bethell, *Abolition,* chapters 3, 12 and appendix.
[74] Klein and Luna, *Slavery*, p. 153. For Bahia see Barickman, *Bahian Counterpoint*, p. 137; Schwartz, *Sugar Plantations*, p. 343. For Pernambuco, see Galloway, 'Sugar Industry.'
[75] On slave prices in Bahia, see Barickman, *Bahian Counterpoint*, p. 139. For long-run slave price trends

the slave trade, an internal redistribution of the slave population from the northeast to the southeast took place, until eventual abolition and government subsidised immigration later in the century.[76]

Another indicator concerns the expansion of the agricultural frontier. The years from 1830 to 1834 recorded the highest number of new sugar *engenho* registrations in Bahia during the nineteenth century.[77] There are also indications of a similar trend in the number of *fazendas* in the southeast.[78] Indeed, the country possessed a superior endowment of fertile land in the southeast that – due to climatic conditions – favoured the cultivation of coffee.[79] In the northeastern regions – particularly around the Recôncavo in Bahia but also in Pernambuco – large swathes of uncultivated land allowed for the gradual expansion of sugar, tobacco and cocoa plantations.[80] Moreover, from independence until 1850 the enforcement of property rights for land remained largely unregulated. Besides the pre-existing land titles (*sesmarias)* granted by the Crown before independence, the definition of property rights during the first three decades of the independent Empire was achieved through informal occupation (*posse*). While the ambiguous nature of property rights frequently resulted in conflict, there were few legal impediments to the expansion of cultivation, particularly by the more powerful 'large scale squatters.'[81] The Land Law (*Lei de Terras*) of 1850 recognised all previously claimed *posses* and *sesmarias* but prohibited the informal occupation of land, instead only allowing for acquisition through

in Minas Gerais and Rio de Janeiro, see Klein and Luna, *Slavery*, pp. 98-299. For a comparison with Cuba, see Eltis, *Economic Growth*, Appendix C.

[76] On the internal slave trade: Klein, 'Internal Slave Trade.' On abolition see Conrad, *Destruction*; Bethell, *Abolition*; Klein and Luna, *Slavery*, chapter 10. On immigration, see Leff, 'Economic Retardation,' p. 494; Holloway, *Immigrants*.

[77] Barickman, *Bahian Counterpoint,* p. 36; for the number of mills in Pernambuco, see Eisenberg, *Sugar Industry*, Appendix 3.

[78] For the case of São Paulo, see Luna and Klein, *Slavery and the Economy*, pp. 56-57.

[79] Stein, *Vassouras*; Delfim Netto, *O problema*; Dean, *Broadax*.

[80] For Bahia, see Barickman, *Bahian Counterpoint*, chapter 5. For Pernambuco, Galloway, 'Sugar Industry,' p. 288-290.

[81] Abreu and Corrêa do Lago, 'Property rights,' p. 327.

purchase.[82]

Furthermore, indicators of non-bank financial transactions show steady growth during the decades following independence despite the scarcity of private financial institutions and the high costs of borrowing.[83] This complements Zephyr Frank's work on wealth holding in the southeast, which has shown that, rather than remaining stagnant, mean wealth grew over the four decades after independence. Frank's examination of the credit market in São João del-Rei in the state of Minas Gerais during the post-independence period revealed a 'vast informal credit market' associated with the domestic and export economy.[84] Of course, the presence of an informal market implied higher borrowing costs. In the absence of regulated financial institutions, planters were in large part beholden to the services of intermediaries (*comissarios*) for credit.[85] Inheritance, marriage and personal loans from non-bank lenders were other informal ways of obtaining credit. Given the speculative nature of much of this borrowing and the lack of a regulatory framework, the cost of borrowing during this period was generally quite high.[86] Such conditions, however, did not seem to reduce the demand for credit.

An additional indicator of post-independence dynamism can be observed in the demand for traditional modes of transportation. It's certain that during this period infrastructure was rudimentary at best; before the introduction of rail, the common mode of transport was the mule. The high incidence of transport costs affected not only the profit margin of producers but also the productivity of plantations. In the case of coffee, Herbert Klein estimated that one-third of a fazenda's slave labour force was dedicated to

[82] Alston et al., *Titles*, p. 35; Abreu and Corrêa do Lago, 'A economia brasileira;' Dean, 'Latifundia.'
[83] Ryan, 'Credit,' p. 88.
[84] Frank, 'Wealth Holding,' pp. 242-246. See also the discussion in Frank, *Dutra's World*, pp. 104-105. For the case of Minas Gerais, see Filho and Martins, 'Slavery;' Bergad, *Slavery*.
[85] In the case of sugar, see Eisenberg, *Sugar Industry*, pp. 63-67: for coffee see Stein, *Vassouras*, pp. 17-20.
[86] Summerhill, *Inglorious Revolution*; Ryan, 'Credit,' p. 82-103; Eisenberg gives prime interest rates for Recife, which descended from 18 per cent in 1835 to 9.43 per cent in 1857. Eisenberg, *Sugar Industry*, p. 64.

the transportation of coffee sacks to market.[87] Thus, the expansion of the agricultural frontier was limited until the development of the rail network that took place after the 1860s.[88] In fact, like many economies in Latin America, investment in transport infrastructure was largely driven by the demands of the planters.[89] Construction did not begin until 1852 and continued during the final half of the nineteenth century, effectively generating large social savings for freight services and providing an impetus to the development of the domestic market.[90] Despite the lack of infrastructure and associated transport costs, however, it is evident that the supply of traditional modes of transportation increased alongside the expansion of export industries. According to Klein's estimates, the average arrival of mules to the Sorocaba market in the state of São Paulo doubled during the 1830s and showed a steadily increasing trend until the 1870s.[91] Aida Lavalle and Carlos Suprinyak observed similar tendencies in Rio Negro and Itapetininga, respectively.[92]

Here we seek to provide a solid empirical basis for the literature on Brazilian export dynamism during the post-independence decades. Before doing so, however, a thorough reconstruction and analysis of the Brazilian export series is necessary.

THE RECONSTRUCTION OF BRAZIL'S EXPORT STATISTICS

Foreign trade statistics are perhaps unique in the statistical universe for being a useful case of double accounting: the quantity and value of imported and exported commodities appear in records of differing nationalities. This allows for a comparison of these records in order to ascertain the accuracy of origin or destination statistical sources.

[87] Klein, 'Supply.'
[88] For the expansion of the railway and associated social savings costs see Summerhill, 'Big Social Savings,' pp. 74-75.
[89] Summerhill, 'Development.' For the case of Cuba, see Zanetti and García, *Sugar and Railroads*.
[90] Summerhill, *Order*.
[91] Klein, 'Supply,' pp. 9-10.
[92] Lavalle, *Análise*; Suprinyak, *Tropas*, Chapter 2.

Unfortunately, at least for the period under examination, there existed no homogeneous international classification system regulating foreign trade statistics. The absence of such regulation engendered a debate regarding the reliability of these statistics.[93] Oskar Morgenstern's observation that 'Writers on all phases of foreign trade will have to assume the burden of proof that the figures on commodity movements are good enough...'[94] has since led to a substantial amount of quantitative soul-searching by economic historians and students of international trade. Although D. C. M. Platt was slightly less pessimistic about Latin American trade statistics, his conclusions were still disheartening.[95] Over the last few years the countries of Latin America and the Caribbean have been subjected to an audit of their historical foreign trade statistics.[96] Much of this work has contradicted Morgenstern and Platt's pessimistic view of the reliability of these statistics.

The accuracy of Brazil's historical foreign trade statistics, while being included in a number of these studies, has not been conclusively evaluated. Certainly, several scholars have recognised and attempted to correct the limitations of these statistics. This work includes the correction of the inclusion of bullion in the official series of exports and imports[97] and the examination of the accuracy of the official value of exports.[98] These studies, however, have only focused on later periods, and have not definitively addressed problems involving the value and destination of official export statistics. Here we focus primarily on the accuracy of the official values.

During the period under study, the official values of exports were fixed by the *pauta semanal*, a price schedule issued on a weekly basis by a government committee in

[93] The pessimistic perspective is most eloquently articulated in Morgenstern, *Accuracy*; for the optimistic perspective, see Federico and Tena-Junguito, 'Accuracy.'
[94] Morgenstern, *Accuracy,* p. 180.
[95] Platt, 'Problems.'
[96] For example, see Kuntz Ficker, 'Nuevas series;' Rubio and Folchi, 'Accuracy;' Carreras-Marín and Badia-Miró, 'La fiabilidad;' Tena-Junguito and Willebald, 'Accuracy;' Bonino-Gayoso et al., 'Uruguay.'
[97] Corrêa do Lago, 'Balança;' *O comércio exterior*; Franco, 'O balanço.'
[98] Wileman, *Brazilian Exchange*.

consultation with local commodity brokers and commercial associations. The average weekly market prices of each commodity included in the nomenclature of the *pauta* were 'verified' in the market before being published and sent to the Ministry of Finance, provincial customs houses and major periodicals.[99] Export duties were collected at the port of shipment by applying the values listed in the *pauta* to the quantities given in the manifests of the ocean going vessels.[100] Until the end of the nineteenth century the values used to calculate export statistics were those fixed by the *pauta*.[101] Any bias in the official price schedule would thus be reflected in the statistics. In 1900, after publishing his landmark study of 1896, *Brazilian Exchange: The Study of an Inconvertible Currency*, the British civil engineer J. P. Wileman was contracted by the Brazilian Ministry of Finance to assist in the modernisation of the state's statistical apparatus and the creation of the *Serviço de Estatística Comercial*.[102] From 1901 onwards, the official trade statistics were published annually by the *Serviço* in a publication that would assume the title *Comércio Exterior do Brasil*. The values listed in this publication were calculated using the market price given at the port of departure.[103] These values included export duties and other transaction costs (such as the cost of cartage, packing and loading) but not freight, insurance or landing costs.[104]

Due to the reliance upon official values for the calculation of export statistics during the nineteenth century, the veracity of these values was sensitive to the fiscal exigencies of the government, the influence of the brokers and commercial associations and the competencies of the statistical apparatus of the state.[105] Apart from the recognition of the

[99] Brazil, *Regulamento*, p. 242.
[100] Brazil, *Commercio Exterior*, p. XXI.
[101] Wileman, *Brazilian Exchange,* p. 83.
[102] Franco, 'O balanço de pagamentos do Brasil,' p. 2.
[103] Although occasionally reference was made to the *pauta*. For example, see Brazil, *Importação*, pp. 208-209.
[104] Brazil, *Commercio Exterior,* p. XXI.
[105] While it is outside the purview of this paper to provide a comprehensive explanation for the bias shown in the official statistics, it is possible to offer several conjectures. One reason might be simply that official

possible inaccuracy of the official values of Brazilian export statistics,[106] however, the veracity of these values has been the subject of little attention in the literature. Wileman included in *Brazilian Exchange* an examination of the accuracy of official valuations for the period 1861 to 1888. He concluded that the official statistics were marginally under-valued.[107] Wileman assumed somewhat arbitrarily that trade and transaction costs accounted for 15 per cent of the official value, which included '...all expenditure from date of purchase to delivery on board...' but excluded the cost of freight rates.[108] This assumption is difficult to sustain for the periods preceding (when freights weighed heavily on total export value) and succeeding (when export duties for certain commodities sometimes exceeded 15 per cent) Wileman's study.

Here we confirm and extend Wileman's findings by way of the construction of a price accuracy index for Brazilian exports during the period 1821 to 1913. Following the methodology commonly employed in the literature to test for price accuracy,[109] we collect the prices[110] of a representative sample of export commodities including cacao, coffee, cotton, hides, rubber and sugar. These prices are then contrasted with their corresponding

values were not updated in a timely fashion. There is evidence of this in the case of import values which were modifiable only by Act of Parliament and thus were frequently unrepresentative of market values. See Versiani, 'Industrialização,' p. 24. This is evident in certain cases (for example, cotton during the first decade of independence) in which official prices tended to lag behind international price changes. Another reason for the bias may be the influence of commercial associations. As Eugene Ridings observed, it was in the interest of export lobbies to reduce as much as possible the elasticity of the official price schedule with relation to ascending price movements in order to avoid an increased tax burden. If prices were descending, however, they would lobby for the frequent adjustment of official prices in order to avoid paying more taxes. See Ridings, *Business interest groups*, p. 199. This remains an open question for future research.

[106] Franco, 'O balanço,' p. 2; 'Setor Externo,' p. 561.

[107] Summarising his conclusions over three periods, Wileman estimated the ratio of local to foreign valuations as 97 per cent for the period 1865 to 1878, 88.3 per cent for the period 1879 to 1886, and 98 per cent for the period 1886 to 1888. Wileman's sample of trading partners included Great Britain, France, Belgium, Germany (Hamburg), the United States, Portugal, Austria, Uruguay and Argentina. To the total valuation of imports from Brazil to these countries was added 10 per cent for 'unspecified countries' and 15 per cent was subtracted to cover the freight factor. See Wileman, *Brazilian Exchange,* pp. 122-123.

[108] *ibid.* p. 124.

[109] Federico and Tena-Junguito, 'Accuracy;' Tena-Junguito and Willebald, 'Accuracy;' Antonio Tena-Junguito, *Las estadísticas*.

[110] This 'price,' as well as those derived from the U.K. import statistics, is effectively the computed unit value; that is, total value over total quantity. We take the official prices of these commodities from Brazil, *Anuário Estatístico*, pp. 1374-1378.

international prices.[111]

As a proxy for the average level of international prices, we have used two sources. For the period 1854 to 1913, we use the prices derived from the United Kingdom's import statistics. We assume that the latter reflect the international price of these commodities, an assumption that is supported by a comparison of the British data with Augustus Sauerbeck's series of international prices of selected commodities.[112] The period before 1854 is more problematic due to the absence of a common point of reference such as the Sauerbeck series.[113] In order to confirm the accuracy of this period and achieve the most representative series possible, we have constructed a weighted average of prices from different origins to the United Kingdom and Philadelphia for the commodities in the sample.[114] As weights we use the distribution of each origin in the sum of the quantum of exports of all origin countries for each commodity. An important consideration when choosing which price series to include in the weighted average is the quality of the commodity in question. Coffee is a particularly difficult commodity in this regard as quality is largely dependent upon the singular characteristics of each producer.[115] To account for this somewhat heterogeneous nature, we have included a wide range of series. Sugar, however, is a different story. The majority of Brazilian exports of cane sugar during this period were of the muscovado variety.[116] We have thus excluded other

[111] Tobacco and herva mate, while also occupying lesser but still important portions of Brazil's exports, have been dropped due to the absence of data on international prices. Even in the absence of these commodities, the sample covers an average of 88 per cent of the value of exports during the period in question, ranging from a minimum of 66.6 per cent in 1844/45 and a maximum of 93.9 per cent in 1895 according to official statistics.

[112] The correlation coefficients of the selected commodities during the period 1854-1912 are as follows: coffee = 0.91, sugar =0.98, cotton = 0.99, hides = 0.84.

[113] Import price data records of the United Kingdom, France, and Belgium were valued at fixed prices until 1854, 1847 and 1846, respectively. This implies that the use of these records to evaluate Brazil's official valuation is not useful and justifies the use of the international price series used here.

[114] For this period, we are obliged to drop rubber from the sample due to the lack of international price data. This is not such a problem, however, as rubber occupied a marginal portion of Brazil's total exports. The sources for prices and weights are given in appendix 2.1.

[115] See Topik, 'World Coffee Market,' pp. 5-6.

[116] For the period 1910 to 1913 it accounted for 57.7 per cent of total sugar exports. Brazil, *Commercio Exterior,* pp. 72-75.

qualities, such as white or beet varieties, from the sugar series. While it is impossible to perfectly homogenise each weighted average by quality given the limited information available, we have taken the utmost care to include only the price series of certain qualities that, where possible, reflect those qualities exported from Brazil. Finally, we have taken the arithmetic average of each series and Sauerbeck's series during the period 1846-1855 to ensure a smooth transition between the weighted average and British series.[117]

The international series represents the c.i.f. (cost, insurance and freight) values of Brazilian exports or their value at the Brazilian border plus insurance, freight and other associated trade costs. From 1821 to 1900 official Brazilian statistics are presented as f.o.b. (free on board) values, representing the value of exports at the Brazilian border and not including trade costs. As mentioned previously, from 1901 onwards these statistics include the value of export taxes but not freight or insurance costs. In order to make any meaningful comparison with the Brazilian data, the international series must therefore be converted to f.o.b. values. With this in mind, we have constructed a new series of freight rates and export taxes and we have used these costs, together with data on the insurance cost, to adjust the international series from the c.i.f. values to the f.o.b. values reflected in the Brazilian statistics.[118]

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[117] For a precise explanation of how this transition has been undertaken, see appendix 2.1 and Figure 2.1A. In the case of hides, we were unable to locate data on world exports, and thus our price series until 1846 is the arithmetic average of several different sources. This is not such a problem for the reconstruction of our series, however, given that hides occupied a minor share of exports during the century. Furthermore, our adjustment serves to establish a middle ground between the dynamism of the early series and the trend of the British series.

[118] The weight of trade costs depends largely on the commodity in question. Generally, this factor ranged between 4.4 per cent (sugar, 1857) to 23.5 per cent (rubber, 1898) of the c.i.f. value. Such variability was due not to freight rates, which generally tended to decline during the period, nor to insurance costs, but rather to export taxes which differed quite drastically between commodities, particularly during the Republican period. Unlike other Latin American countries, Brazilian export taxes did not decline during the latter half of the century. Instead, provincial governments took advantage of the opportunity to set export taxes awarded to them by the Republican Constitution of 1891. This resulted in a sharp increase in the weight of taxation during the last decade of the nineteenth century which, in the case of the taxation of rubber exports in the state of Pará, saw ad valorem taxes rise as high as 22 per cent. For the case of Amazonia, see Fernandes, 'Stretching.'

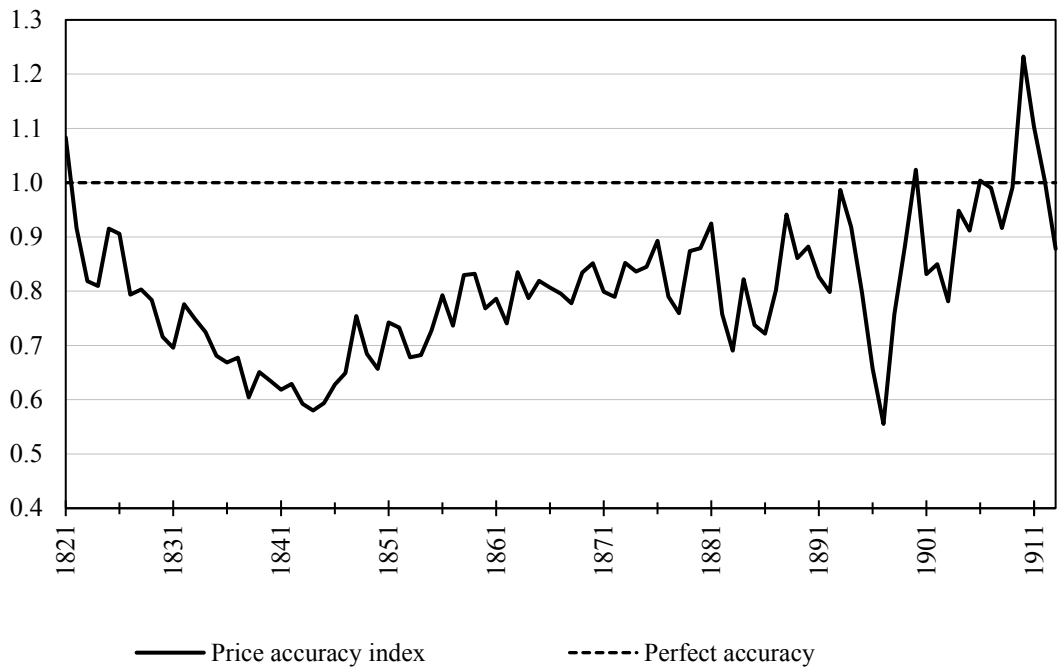

Figure 2.1. *Price Accuracy Index, Brazil, 1821-1913*

Notes: Full series p. 260. *Sources:* see Appendix 2.1.

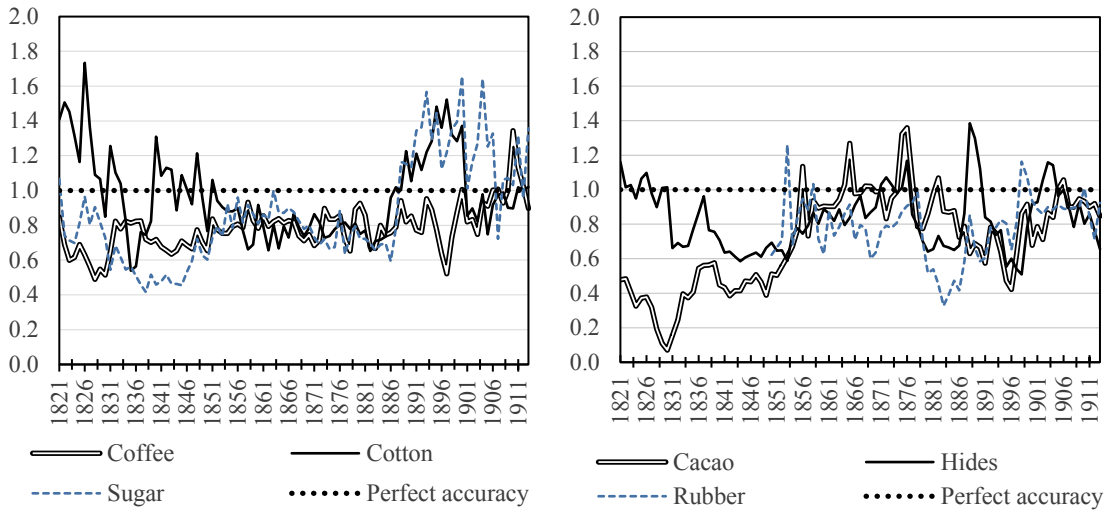

Figure 2.2. *Price accuracy indices by commodity, Brazil, 1821-1913*

Notes: Full series p. 260. *Sources:* see Appendix 2.1.

Figure 2.1 shows the general price accuracy index of the commodity sample for the years 1821 to 1913. If perfectly accurate, the adjusted international series should reflect the official Brazilian f.o.b. export values. However, the index clearly confirms Wileman's findings of under-valuation. This under-valuation is particularly acute during the first half of the century. Furthermore, as predicted, the series tends towards perfect accuracy after the institution of the *Serviço de Estatística Comercial* in the early 1900s. Disaggregation by commodity reveals the trends underlying this general under-valuation. As Figure 2.2 shows, each commodity was consistently under-valued except for a few notable periods. Most notably, cotton and sugar tended towards over-valuation immediately after the founding of the Republic in 1889, a tendency that continued into the twentieth century. Given the weight of coffee in the export economy, however, this over-valuation is not reflected in the general price accuracy index.

A REAPPRAISAL OF BRAZILIAN EXPORT GROWTH

In sum, an examination of the accuracy of the values of Brazil's export statistics reveals a clear bias towards under-valuation. In order to correct this bias, we reconstruct the series using international prices. During the period under consideration the commodity structure of Brazil's exports changed considerably. Although coffee played a leading role in the export sector from 1831 onwards, four other commodities also maintained substantial shares during different periods: cotton (1821-1837, 1862-1874), hides (1821-1832, 1844-1846), sugar (1821-1885) and rubber (1886-1913).[119] Given the long-run nature of the study it is important to utilise a methodology that accounts for the changes in Brazil's composition of exports. We thus elaborate a Fisher export price index using the corrected prices of the commodities in the sample. This index is used to deflate the series from current to constant prices, from which the growth rates are calculated. We

[119] See appendix 2.4.

compare the new growth rates to those calculated using a number of other export price indices based on the official unit values. The first is a Fisher export price index for the period from 1850 to 1913 which was elaborated by Reinaldo Gonçalves using the unit values given in the official Brazilian statistics.[120] Furthermore, we compare the reconstructed series to a second export price index commonly used in the literature on export growth constructed by Christopher Blattman, Jason Hwang and Jeffrey Williamson (hereinafter BHW) using the same commodity sample and spanning the period from 1860 to 1913.[121]

Table 2.1 displays the growth rates of exports derived from the new series at constant prices alongside the official, Gonçalves and BHW series. We present both medium- and long-run periods beginning from 1821, 1850, 1870 and 1890 in order to capture the changes in the composition of exports. The two decades prior to the series represented here were characterised by considerable price volatility, due in large part to the effect of the Napoleonic Wars. After 1818, however, the prices of Brazil's principal export commodities began a gradual descent that ended in the 1830s.[122] Although quantum data for Brazilian exports after the end of the Portuguese trade monopoly in 1808 are difficult to come by, descriptive evidence suggests that liberalisation had a positive impact on Brazil's export industries during the decade prior to independence despite falling international prices.[123] As can be seen in Table 2.1, the period from 1821 to 1913 is not

[120] Gonçalves, 'Índices.' This index uses a sample of eight commodities (cacao, coffee, cotton, herva mate, hides, rubber, sugar and tobacco) with 1880 as the base year, the unit values of which are taken from the *Anuário Estatístico* of 1939/40. This index was later reproduced in Brazil, *Estatísticas Históricas*, p. 597.
[121] Blattman et al., 'Winners and losers.' The BHW index is a chained Laspeyres index that uses the British c.i.f. unit values.
[122] This description of the context prior to the start of our series (1800-1820) is based on the elaboration of a chained Laspeyres-Fisher export price index, adjusted for trade costs, calculated from data on sugar, coffee, cotton, hides, and tobacco prices from Gayer et al., *Microfilmed Supplement* and Bezanson et al., *Wholesale prices*. Prices rose rapidly from the beginning of hostilities until the French loss in the Battle of Trafalgar in 1805, and then fell consistently before rising again during the hostilities between the United Kingdom and the United States. For the economic impact of the Napoleonic Wars, see Bulmer Thomas, *Economic History of the Caribbean*, p. 78; O'Rourke, 'Worldwide economic impact.' See also the wholesale price series in Figure 1.2.
[123] Bethell, *Brazil*, p. 6-7; Cardoso, '1808,' p. 120; Bergad, *Slavery*, Chapter 2.

Table 2.1. *Export growth rates (%), per annum, Brazil, 1821-1913*

	Corrected	Gonçalves	BHW
1821-1850	5.9		
1821-1870	4.6		
1821-1890	3.6		
1821-1913	3.7		
1850-1870	2.8	2.4	
1850-1890	2.0	2.1	
1850-1913	2.8	2.8	
1870-1890	1.3	1.9	0.9
1870-1913	2.8	3.1	3.2
1890-1913	4.3	4.2	5.3

Sources: see Appendices 2.1 and 2.2.

Table 2.2. *Volume and price growth rates (%), per annum, by commodity, Brazil, 1821-1913*

	1821-50	1850-70	1870-90	1890-1913	1870-1913	1821-1913	1850-1913
				volume			
Cacao	4.9	0.7	1.7	7.1	4.5	3.7	3.2
Coffee	9.7	3.0	2.0	4.3	3.2	5.1	3.1
Cotton	1.3	5.6	-6.5	4.9	-0.4	1.4	1.5
Hides	2.4	1.6	-0.2	3.4	1.7	1.8	1.6
Rubber	--	7.7	6.0	3.9	4.8	--	5.6
Sugar	4.5	0.1	0.3	-14.6	-7.5	-2.1	-5.1
				prices			
Cacao	-2.2	0.03	2.9	0.2	1.5	-0.01	1.0
Coffee	-3.4	0.4	2.3	-0.8	0.6	-0.7	0.5
Cotton	-0.3	2.0	-2.9	1.1	-0.7	-0.02	0.1
Hides	-1.4	0.9	-1.1	4.8	2.0	0.7	1.7
Rubber	--	3.8	0.9	0.4	0.6	--	1.6
Sugar	-0.8	-1.0	-3.1	-0.8	-1.8	-1.3	-1.5

Sources: see Appendices 2.1 and 2.2.

particularly exceptional, with growth rates of the corrected series for the period from mid-century onwards lying between the Gonçalves series and the dynamism of the BHW series. The period from 1821 to 1850, however, reveals a much more dynamic panorama. Exports grew faster than any other period of the nineteenth century at a rate of 5.9 per cent per annum. Further disaggregation of this period into decades is even more revealing. The export growth of this period to a large degree took place during the two decades immediately following independence.

Disaggregation by commodity highlights several divergent tendencies. Table 2.2 displays the growth rates of the value of Brazil's principal export commodities in constant prices. Coffee was the principal protagonist of this period, exhibiting a growth rate in its sterling value of 9.7 per cent per annum. Sugar, although showing considerably less dynamism at 4.5 per cent per annum, was far from the stagnation and decadence that would characterise its experience in the latter half of the century. On the other hand, cotton, which had occupied such a central role in the export growth of the northeast during the late-eighteenth century, was clearly showing signs of stagnation at 1.3 per cent per annum. It must be noted that the unparalleled growth of sugar and coffee occurred during a period in which international prices were generally declining. The decline of coffee prices is especially notable given the dynamism of the observed growth rates.

Finally, the corrected series allows for the calculation of the exports-to-GDP (openness) ratio. The veracity of the historical GDP series is a controversial topic, given the paucity of data for most of the nineteenth century. Here we present three openness estimates, based on two seminal contributions (one by Cláudio Contador and Cláudio Haddad, the other by Raymond Goldsmith) and a recent estimation by Guilherme Tombolo and Armando Vaz Sampaio. All three series are based on assumptions taken in

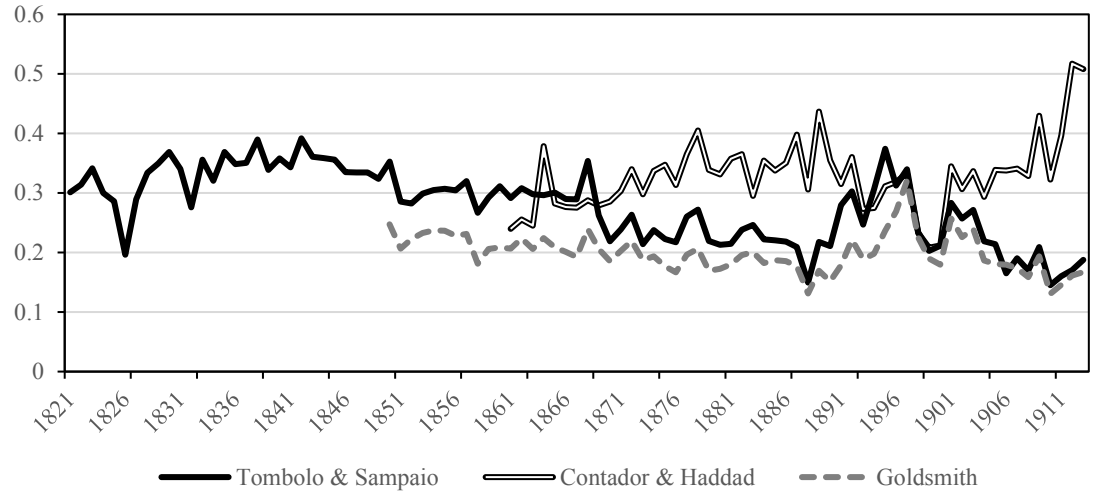

Figure 2.3. *Openness of Brazilian economy, percentage of total exports in GDP, values at current prices, 1821-1913*

Notes: Full series p. 263. *Sources:* Exports: see appendix 2.1. GDP: Tombolo and Sampaio, 'O PIB brasileiro;' Contador & Haddad, 'Produto real;' Goldsmith, *Desenvolvimento*.

the absence of empirical information.[124] However, a comparison of all three provides a general idea of the degree of openness of the Brazilian economy. As can be seen in Figure 2.3, Brazil's degree of openness to the international economy was higher during the earlier period than previously thought. In previous work, Leff also estimated an export-to-GDP ratio of 16 per cent for the period 1911-1913. Given that the export sector was the fastest growing sector of the Brazilian economy, Leff argued that such a figure would suggest a much lower portion during most of the nineteenth century. This led Leff to the conclusion that the internal market was the principal driving force behind Brazil's economic growth, employing most the country's economically active population. As can be seen in the figure, however, if we assume that the GDP estimation is reliable, the export sector accounted for a growing and much larger portion of the economy during the post-

[124] The Contador and Haddad series is based on exports, imports, government spending, the consumption of cement and the total installation of electricity, each series covering different periods. The Goldsmith series is based on an average of wages, imports and exports, government spending and the money supply, plus five per cent depreciation. The Tombolo and Sampaio series is calculated by regressing nominal GDP over the population, government revenue, imports and exports, and the money supply (M2) for the period 1900-1947, followed by a test of co-integration. The resulting coefficients were then used to calculate the values for the nineteenth century. For a critique of our estimation, see Villela, 'Nineteenth.'

independence period, falling to Leff's predicted levels only after 1870.[125] Although this is certainly surprising, it serves as further evidence of the dynamism of the post-independence Brazilian export economy. In terms of income growth, however, Brazil's positive export performance must be qualified. As can be seen by the commodity-level data, export growth was largely confined to a single sector: coffee. What's more, coffee production was highly concentrated in the southeastern regions of the country, gradually diffusing from Rio de Janeiro to São Paulo.[126] So while export growth following independence and during the 1890s was more dynamic than previously appreciated, this growth was unequally distributed both in sectoral and geographic terms.[127]

WORLD DEMAND AND BRAZILIAN COMPETITIVENESS DURING THE POST-INDEPENDENCE DECADES

The corrected series effectively permits us to reappraise the traditional narrative of Brazilian export growth and to lend support to the literature on early Brazilian economic dynamism. Here we explore the conditions surrounding Brazil's dynamic export growth experience during the post-independence decades. The first step is to ascertain how much of this growth was attributable to factors related to Brazil's international competitiveness, and how much was due to the shift in world demand for Brazil's commodities. In order to untangle the effects of these determinants, we undertake a constant market share analysis of Brazilian export growth. The underlying assumption of constant market share analysis is essentially counter-factual; we assume that Brazil's export share in the world market remains unchanged over time. Any differentials that arise between our constant-share assumption and observed export performance are attributable to a residual factor,

[125] See Leff, 'Tropical Trade,' p. 690; 'Economic Development,' p. 41.
[126] Prado Júnior, *História*, pp. 159-167.
[127] Leff, 'Economic Development and Regional Inequality,' pp. 244-245.

commonly interpreted as a competitiveness effect.[128] Here we perform a simple disaggregation of Brazil's export growth into two factors.[129] The first, the demand effect, uses the growth of world exports as a proxy for world demand, and reports how much of Brazil's market share is explained by the increase (or decrease) of this demand. The second, the competitiveness effect, reveals how much is explained by the increase (or decrease) of a country's competitiveness vis-à-vis other suppliers. We present an aggregate (which includes 55 countries) and disaggregate (which includes France, the Netherlands, Portugal, Sweden, the United Kingdom and the United States) world in order to control for the growth of world demand unrelated to Brazil's principal export markets. Table 2.3 displays the results.

Constant market share analysis reveals that world demand was the principal determinant of Brazil's export growth during the post-independence decades and the first globalisation. The negative sign of the competitiveness effect indicates that Brazil's response to the expansion of world demand was negatively affected by the loss of competitiveness. This does not change when the world is reduced to its principal trading partners. The implication of these results is that, at least on an aggregate level, Brazil consistently lost market share for its exports across the nineteenth century. As we have seen, however, the nuances of Brazil's long-run export performance were commodity-specific and thus will only be detected by way of a disaggregated analysis.

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[128] For a theoretical discussion of constant market share analysis, see Leamer and Stern, *Quantitative*, Chapter 7; Richardson, 'Constant market shares.' For an example of its application to economic history, see Tena-Junguito, 'Protección,' pp. 342-350.

[129] Although it is customary to further disaggregate export growth into market distribution and commodity composition effects, we are restricted by the questionable quality and paucity of official bilateral data. A test of the accuracy of the geographical distribution of bilateral statistics by value and quantity highlights several serious problems. To begin with, the series is incomplete. Data are only available for the years 1842/43, 1852/53, 1862/63, 1872/73, and the period from 1901 onwards. Furthermore, the Brazilian export records are found to be considerably and consistently overvalued when compared to trading partner import records. This incorrect geographic assignment of exports might have been driven by differing conceptions of origin and destination and in some cases by smuggling or fraudulent practices by government officials in customs houses. See Platt, 'Problems,' p. 121; Brazil, *Proposta ... 1876*, pp. 66-67; Flores, 'Contrabando.'

Table 2.3. *Results of constant market share analysis, millions of 1913 pounds sterling, 1821-1913*

		1821-1850	1850-1870	1870-1890	1890-1913	1821-1913
World	Brazil Export Increase	10.8	9.5	6.2	45.4	72.0
	World Demand	7.3	19.2	21.8	31.2	94.3
	Competitiveness Effect	3.5	-9.7	-15.5	14.2	-22.4
Partners	World Demand	7.0	17.4	23.0	25.6	80.7
	Competitiveness Effect	3.8	-7.9	-16.8	19.8	-8.7
Cacao	Brazil Export Increase	3.0	0.5	1.7	23.5	28.7
	World Demand	1.1	2.2	6.5	20.6	40.4
	Competitiveness Effect	1.9	-1.7	-4.8	2.9	-34.9
Coffee	Brazil Export Increase	114.8	80.3	53.4	564.0	812.4
	World Demand	21.9	83.8	68.0	256.5	142.5
	Competitiveness Effect	92.8	-3.5	-14.6	307.6	669.9
Cotton	Brazil Export Increase	4.3	28.8	-31.2	8.0	10.1
	World Demand	15.2	19.2	31.4	3.7	118.5
	Competitiveness Effect	-10.6	9.6	-62.7	4.3	-108.4
Sugar	Brazil Export Increase	85.5	3.0	6.8	36.1	134.8
	World Demand	66.9	143.5	179.8	94.2	854.6
	Competitiveness Effect	18.6	-140.5	-173.0	-58.1	-719.7

Sources: see Appendix 2.3.

Indeed, such an analysis confirms our revision of Brazil's export growth performance. The initial dynamism was driven principally by the relative gains of competitiveness of the coffee sector. From mid-century this competitiveness disappeared only to return during the period 1890-1913.[130] In the case of Brazil's other principal export commodities, we observe a different tendency. Sugar expanded faster than world demand

[130] While an analysis of the competitiveness of Brazil's coffee exports post-1890 is outside the purview of this paper, it is possible to briefly speculate on the determinants of such competitiveness. Despite the abolition of slavery and the post-1906 government valorisation scheme that used Brazil's monopoly supplier position to alter world prices in favour of Brazilian producers, competitiveness was most likely achieved by way of the devaluation of the exchange rate, which itself was linked to the revenues derived from the renewed coffee export boom of this period. On exchange rates for Brazil, see Catão and Solomou, 'Effective;' Cardoso, 'Exchange Rates,' p. 175. On the coffee crisis and subsequent intervention see Delfim Netto, *O problema*; Hutchinson, 'Coffee.' For a study on the extent of Brazil's market power, see Abreu and Fernandes, 'Market power,' p. 8.

in the initial period, due in part to increased competitiveness. After 1850, however, Brazil's sugar export sector lost competitiveness and growing international demand for the commodity buoyed the observed export growth. Cacao evinced a similar tendency. While cotton gained a competitive advantage due to the shock of the American Civil War and its effect on the southern cotton industry, this advantage was largely ephemeral, and in the long-run the sector lost competitiveness over the century. In short, the rapid expansion of world demand for Brazil's products, coupled with an increase in competitiveness for coffee and, initially, for sugar and cacao, determined the observed export growth pattern.

BRAZILIAN DYNAMISM AND DIVERGENCE IN THE TROPICS

As the various indicators outlined in the literature demonstrate, the circumstances afforded Brazil by the turmoil of other tropical agricultural producers in the region stimulated a voracious appetite for slave labour that, when combined with the expansion of the agricultural frontier, drove the observed initial dynamism of export growth. Here we explore Brazil's export performance from a comparative perspective and examine the empirical evidence supporting this view.

Such a comparison is offered in Table 2.4, showing the export growth rates for the Americas during the nineteenth century based on the World Trade series constructed by Giovanni Federico and Antonio Tena-Junguito.[131] These export growth figures confirm Brazil's dynamic export performance during the post-independence years. Brazilian export growth from independence to mid-century more than doubled the South American average and was comparable to that of the United States. Despite the regional disparities in export growth derived from the success of coffee in the southeast and the relative failure of cotton and, to a lesser extent, sugar in the northeast, the country's overall rate

[131] Federico and Tena-Junguito, 'World trade.'

Table 2.4. *Export growth rates (%), per annum, the Americas, 1821-1913*

	1821/25-1851/55	1831/35-1851/55	1851/55-1871/75	1871/75-1891/95	1891/95-1911/13	1831/35-1871/75	1821/25-1871/75	1871/75-1911/13
North America	4.5	4.7	3.5	3.7	4.0	4.1	4.1	3.7
United States	5.2	5.3	3.4	4.0	3.9	4.4	4.5	3.8
Southern USA	5.5	5.1	1.2	3.8	2.6	3.1	3.8	3.1
Northern USA	4.9	5.5	5.2	4.1	4.4	5.4	5.0	4.2
Tropical Agricultural	2.8	2.1	2.3	1.9	3.3	2.2	2.6	2.5
Brazil	5.5	4.4	2.0	1.9	3.5	3.2	4.1	2.6
Cuba	4.6	5.2	4.0	0.8	5.6	4.6	4.4	3.0
Puerto Rico	5.8	3.3	1.7	0.8	-	2.5	4.1	-
Jamaica	-3.4	-5.6	0.9	3.1	2.2	-2.4	-1.7	2.6
Leeward Islands	2.9	-0.2	-0.8	0.4	1.6	-0.5	1.4	1.0
French Guyana	0.9	-3.3	-4.1	9.1	1.3	-3.7	-1.2	5.1
Martinica	0.2	-0.2	3.1	0.4	1.6	1.4	1.3	1.0
Iberian Tropical	5.2	4.3	2.4	1.8	3.7	3.3	4.1	2.6
British Tropical	-1.3	-2.3	1.8	2.3	1.3	-0.3	0.0	1.8
French Tropical	0.8	-0.4	0.9	1.0	1.0	0.3	0.8	1.0
South America	2.6	1.4	3.0	2.6	3.8	2.2	2.8	3.1
TOTAL AMERICAS	3.5	2.9	3.3	3.2	3.9	3.1	3.4	3.5

Source: Federico and Tena-Junguito, 'World trade.'

of export growth was comparatively quite high. The table includes the British and French colonies of the West Indies and the Guianas, as well as the Spanish Caribbean (Puerto Rico and Cuba), Spanish Central America (Guatemala, Honduras, Costa Rica, Nicaragua y Panama) and, of course, Brazil. Amongst this group can be found most of Brazil's principal coffee- and sugar-producing competitors. Another Asian competitor and Dutch colony, Java, would also occupy a leading role in the international coffee (and later, rubber) market, although it is not included here for geographical reasons. While the export growth of this region generally stagnated over the century, disaggregation by country reveals a different trend in those economies that maintained slave (or coerced) labour. During the first half of the nineteenth century these tropical agricultural producers would be torn between countervailing tendencies. On the one hand, Cuba (which became increasingly specialised in sugar production), Puerto Rico and Brazil showed high export growth rates, comparable only to North America on a continental level. On the other hand, the other tropical agricultural producing countries experienced a (in some cases violent) contraction of exports. The British tropical colonies experienced the most severe contraction, Jamaica being the extreme case. The export economies of the French tropical colonies, particularly French Guyana, also contracted. It is clear, therefore, that there was considerable divergence in the export performance of the tropical agricultural producers during the post-independence decades and that this divergence corresponded with the profound institutional changes taking place in the labour markets of the British West Indies.

The effect of the slave emancipation shock is also discernible in the evolution of the relative export market shares of the tropical agricultural producers. Specifically, we examine the effect of this shock on Brazil's market share of coffee and sugar.[132] To

[132] According to Bulmer-Thomas, sugar accounted for over 50 per cent of the commodity exports of the Caribbean in 1820. This would rise to close to 70 per cent in 1880 and fall thereafter. Coffee was the second

ascertain the nature of the evolution of Brazil's market share of world coffee exports, we take a sample of the principal coffee exporting countries for which there are data available from around the time of Brazil's independence, and calculate their relative shares of the world market.[133] The results can be seen in Figure 2.4a. It is clear that Brazil's market share of coffee gradually widened over the nineteenth century at the expense of all of its major competitors. Furthermore, it is evident that most of this market share was gained before 1850. The effect of the slave abolition shock of the 1830s on the British colonies impacted considerably on their market shares. British Jamaica moved from being the fourth largest exporter to holding a minuscule share by the end of the 1830s. After the Napoleonic Wars many French Caribbean coffee-exporting colonies suffered an involution. Indeed, many of the French colonies all but disappeared from the market by the 1850s. The only competitor that did not experience a considerable reduction of its market share during the post-independence decades was Java. Like certain Spanish colonies of the Caribbean, Java was not subjected to the institutional shocks associated with independence or slave abolition. In fact, Java was not a slave plantation economy, although coffee cultivation was imposed upon the peasantry by a strict system of state control.[134] Thus, it also responded to the competitive advantage afforded by the slave abolition shock by expanding its market share of coffee during the post-independence

most important export of the region, maintaining its share throughout the century. See Bulmer-Thomas, *Economic History of the Caribbean,* Figures 5.2 and 5.2.

[133] This sample includes Cuba, Guadalupe, Haiti, Indonesia (Java), Jamaica, Martinique, and Suriname. Together with Brazil this sample represented 81.6 per cent of the quantum of world exports in the period 1851-1855. Unfortunately, data for total world exports is only available from 1851-1855 onwards, calculated by five-year averages. To provide estimates for the decades up until mid-century, we assume that our sample represents 80 per cent of world exports during the period 1823-1850 and estimate world exports based on the sum of the sample countries. This is by no means an unrealistic assumption. At the beginning of the nineteenth century nearly all coffee exported to the world market was apparently produced by European colonies, including, most notably, the ex-colony of Haiti (previously Saint Domingue), the world's leading coffee exporter at the turn of the nineteenth century, followed by other French colonies such as Martinique, Dominica, Guadalupe, the Dutch and British colonies in the Guianas and Jamaica. Once estimated, we use the world exports estimate to calculate five-year average country shares. On the world market for coffee, see Topik, 'World Coffee Market,' p. 16.

[134] Fernando, 'Coffee cultivation,' pp. 157-158.

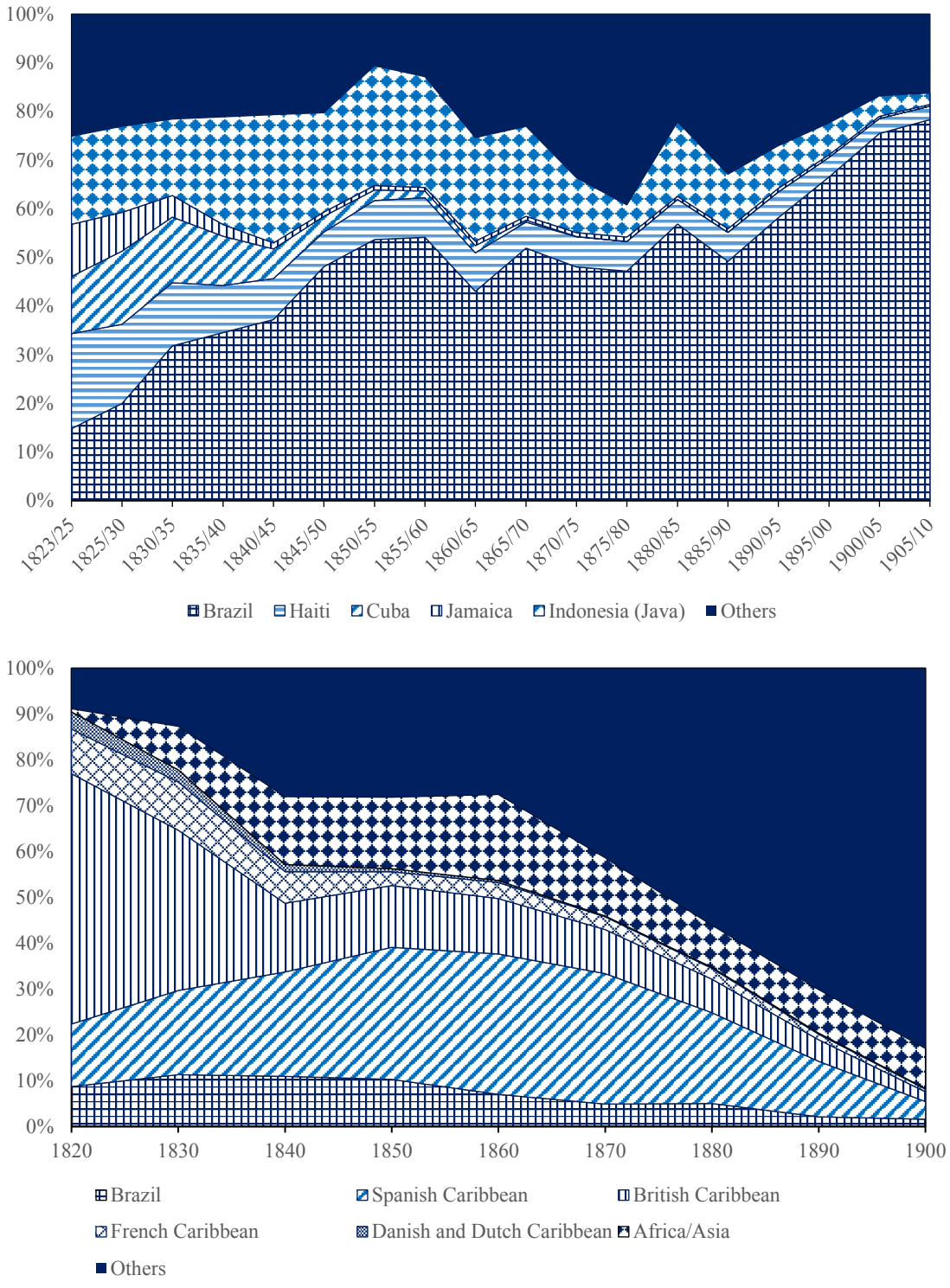

Figure 2.4. *World export market shares (%): a) coffee, 1823-1910, b) sugar 1820-1900*

Notes: Full series p. 266. *Sources:* see Appendix 2.1.

decades. Javanese expansion was brought to a halt, however, by the spread of *Hemileia vastatrix*, a coffee-leaf blight that would devastate Javanese and other Asian and African producers late in the century, effectively permitting Brazil to consolidate its world market share.[135]

In the case of sugar, we obtain data on the world production of both cane and beet sugar and examine the market share of a sample of tropical agricultural countries for the period 1820-1900.[136] Figure 2.4b displays the results. Cuba's market share of sugar expanded substantially during the first half of the nineteenth century. This expansion came at the expense of the British colonies and, to a lesser extent, Brazil. Unlike Brazil's hold over the international coffee market, however, the sugar market would remain sufficiently diversified to prevent Cuban supply from dictating the price trend of the market. Furthermore, the substitution of cane for beet sugar in Western Europe would serve to undermine the market power of tropical agricultural producers.[137] Still, as the export growth rates indicate, the export performance of both Brazil and Cuba diverged quite considerably from that of the other tropical agricultural producers.

Further empirical evidence of the effect of the slave abolition shock is provided in figure 2.5. We compare the shares of the Southern United States (separated from the North for comparative purposes),[138] Brazil, Cuba and the British West Indies in total world exports. The trend of the world export shares of Brazil and the Southern United States is positive until mid-century, when the abolition of the slave trade would affect Brazil's export industries and the Southern United States would be torn asunder by the

[135] Clarence-Smith, 'The Coffee Crisis,' pp. 101-105.
[136] This sample includes the British (Trinidad and Tobago, St. Lucia, St. Kitts, Nevis, Monserrat, Jamaica, Guyana, Grenada, Dominica, Barbados and Antigua), French (French Guyana, Guadeloupe, Martinique), Danish (Danish Virgin Islands), Dutch (Dutch Antilles, Suriname) and Spanish (Dominican Republic, Puerto Rico, Cuba) colonies of the Caribbean, as well as a number of African and Asian producers (Mauritius, Rèunion, Indonesia).
[137] Galloway, *Sugar cane*, pp. 130-134.
[138] We proxy exports from the Southern United States with the sum of exports of tobacco and thus our estimate might undervalue their total share.

effect of the Civil War. Cuba did not respond so positively, due principally to increased European beet sugar production, although it managed to maintain its share across the period.[139] The world export share of the British West Indies, however, declined steadily after abolition. The shock affected the British colonies in several ways. Those colonies with small land to labour ratios were affected by the cost of the transition between labour regimes but did not suffer the loss of much of the work force. Those countries with a greater and unexploited endowment of land suffered not only from an increase in the cost of labour, but also a reduction of supply as many former slaves moved to subsistence farming. A good example of the latter case is British Jamaica that, as we have seen, suffered a violent contraction of exports after abolition. Faced with an exodus of former slaves, the government was forced to source indentured labour from Asia.[140]

The effect of the shock is also discernible in the trends of the international prices of these commodities as shown in Figure 2.6. It is evident that the commodity prices of all of the tropical agricultural producers included responded to the shock of emancipation. The degree of this shock, however, differed across producers. Thus, while British colonial exports (in this case Jamaican coffee and Guyanese cotton) clearly responded to the slave abolition shock, Brazilian and Cuban exports were buffered by the resilience of slavery. In the case of coffee, Jamaican exports were subjected to a threefold increase from 25 in 1830 to 72 and 81 in 1833 and 1839 respectively, while Brazilian exports demonstrated a more moderate increase from 47 to 52 and 41 in the same years. Similarly, the price of Jamaican sugar exports increased twofold from 19 in 1830 to 40 in 1840, whereas Cuban

[139] According to Eisenberg, beet production in France and Germany increased from 46,472 metric tons in 1841-45 to 2,647,888 metric tons around the turn of the century. His estimate of world beet sugar production in 1896-1900 was 5,009,931 metric tons compared to world cane sugar production of 2,445,469. Eisenberg, *Sugar Industry*, pp. 237-240. Furthermore, Cuba's export industries were buoyed by the incorporation of indentured Chinese labour from 1847 onwards. See Hu-Dehart, 'Chinese.'

[140] The effect of slave abolition on the sugar plantations of the British and French colonies of the Caribbean is described in Galloway, *Sugar cane*, pp. 123-130. For an overview of the British West Indies, including the consequences of different land/labour ratios, see Engerman, 'Economic adjustments,' p. 196. For Jamaica, Eisner, *Jamaica*. For British Guiana, Moohr, 'Economic Impact.'

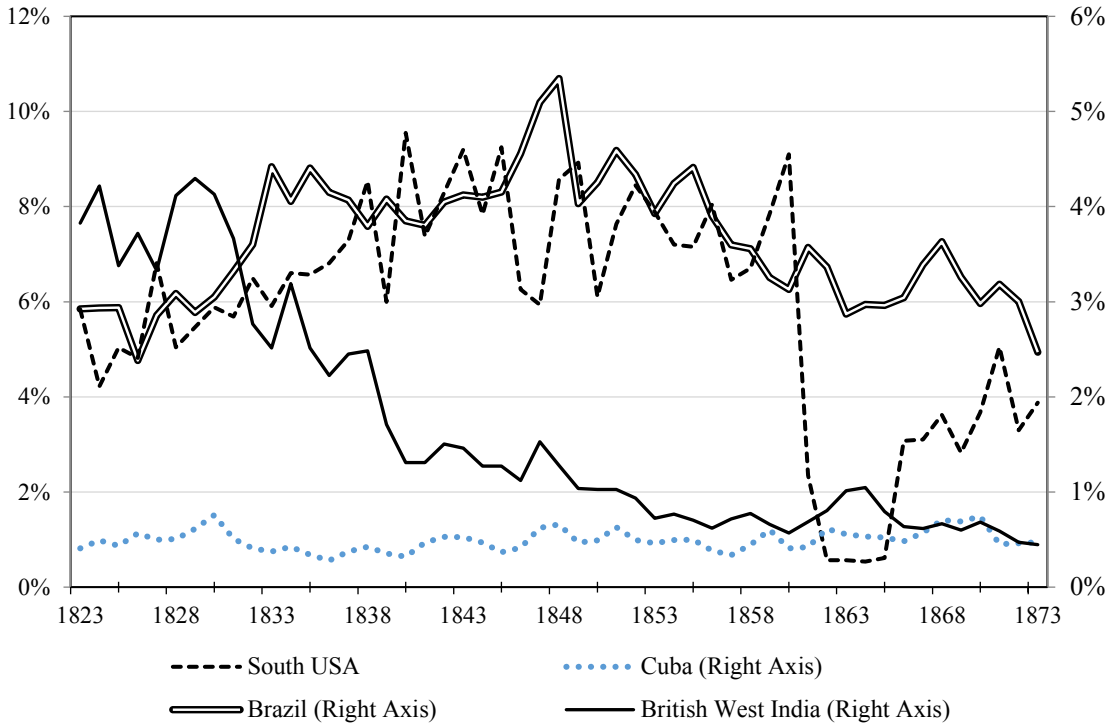

Figure 2.5. *World export market share (%), 1820-1870*

Notes: Full series p. 268. *Sources:* Federico and Tena-Junguito, 'World trade.'

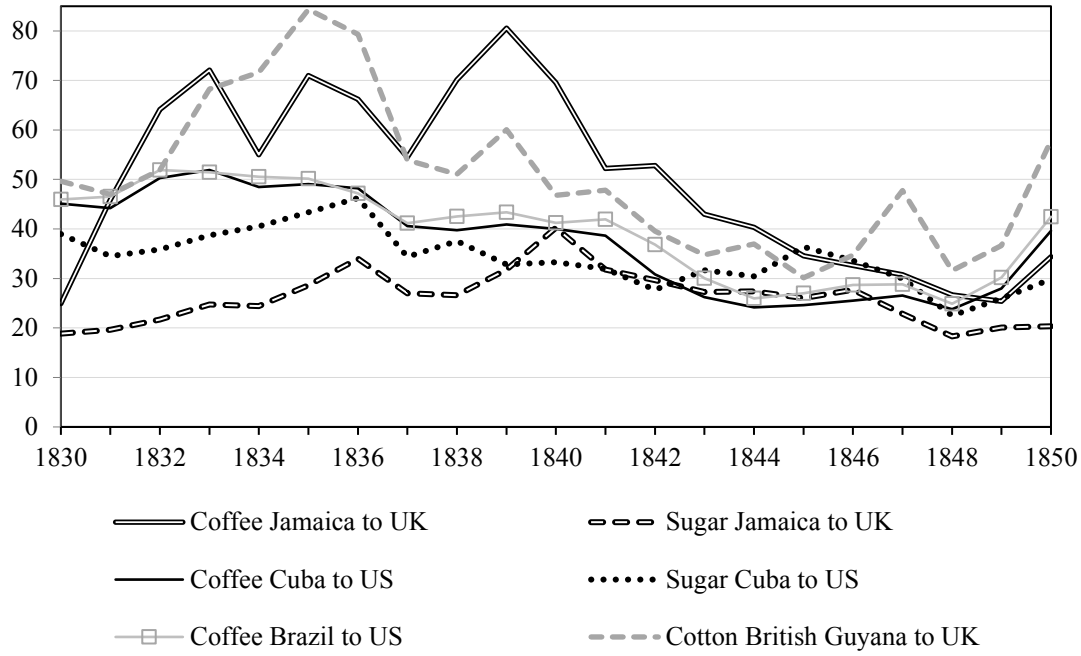

Figure 2.6. *Price of coffee, cotton and sugar, pounds sterling per metric ton, 1830-1850*

Notes: Full series p. 271. *Sources:* see Appendix 2.1.

sugar prices showed a comparatively modest increase of 35 in 1831 and 48 in 1836. British Guyanese cotton prices also show a similar reaction to emancipation. Despite the convergence of trends in coffee and sugar prices during this decade, over the long-run these prices displayed very different tendencies. Unlike coffee, sugar prices showed a decreasing secular trend at least from the 1840s onwards, the result of increased competition in the international market and the expansion of European sugar beet production.[141] Coffee prices, on the other hand, after experiencing rather dramatic fluctuations following the Napoleonic Wars and the slave abolition shock, generally responded to Brazil's supply schedule until the crisis and government intervention of the 1890s, due largely to the strength of Brazil's market power.[142]

CONCLUDING REMARKS

The objective of this article has been to re-evaluate both the statistical basis and narrative of Brazil's export performance during the nineteenth century. As we have seen, the official Brazilian export series was in fact undervalued, thus misrepresenting both the relative share of exports in GDP and the true dynamism of Brazil's export growth during the post-independence decades. Our conclusions lend empirical support not only to the literature on Brazilian economic dynamism during the post-independence period, but also to the comparative study of the export performance of the tropical agricultural producing periphery as a whole. A cross-country comparison shows that Brazil was one of the most dynamic countries in the region. Furthermore, there is clear evidence of divergence within the tropical agricultural producers of the Americas. The catalyst for this divergence was an institutional shock in the form of British West Indies slave emancipation that gave Brazil an initial competitive advantage vis-à-vis other producers of the region. Brazilian producers, both in the northeast and southeast, responded to the incentives provided by

[141] Galloway, *Sugar cane,* pp. 130-134.
[142] See Delfim Netto, *O problema*; Abreu and Fernandes, 'Market power,' p. 8.

the shock by expanding both the agricultural frontier and imported slave labour. Output expanded rapidly and Brazil increased its market share.

Our findings also highlight the importance of a comparative perspective, even when examining individual case studies. Moreover, emphasis must be placed not only on the importance and relevance of a comparative perspective, but also upon the ways in which divergent economic experiences were interrelated. In the case of Brazil, the focus on the smooth transition to an independent Empire has overlooked the importance of the impact of exogenous institutional shocks on the country's export performance. Only by adopting a regional comparative perspective do we comprehend that the story of Brazil's exceptional post-independence export performance *was* a story of institutional shocks.

Together these conclusions indicate a direction for future research. To begin with, the divergence that took place in the tropics during the post-independence decades is deserving of more attention. Further study of the mechanisms underlying this divergence will surely help to understand not only the diversity of short-run economic outcomes but also the long-run development trends of these countries. In respect to Brazilian economic historiography, greater attention should be paid to the post-independence decades in order to further elucidate the drivers and subtleties of the country's dynamic export performance. Finally, an examination of the long-run impact of this period on both export performance and regional income growth would provide a greater understanding of Brazil's economic development during the nineteenth century.

3

The reconstruction of Brazil's foreign trade series, 1821-1913

Abstract. To date, research on the economic history of Brazil during the nineteenth century has relied on official foreign trade statistics, the accuracy of which has repeatedly been put into question. This paper provides insights into the accuracy of the official series by examining the accuracy of the export and import series for Brazil during the nineteenth century. We re-estimate the official import series using trading partner sources and find that the official series was marginally under-valued during certain periods of the nineteenth century. Furthermore, we provide new upper- and lower-bound estimates of the export series by testing different assumptions regarding the size of the c.i.f.-f.o.b. factor adjustments. Finally, we introduce a new import price index for the period 1827-1913.

Foreign trade statistics are perhaps among the most useful – not to mention plentiful - sets of data available to economic historians. For this reason, issues regarding the accuracy of these statistics have long been discussed. The case of Brazil is not much different. Although the weaknesses of the foreign trade statistics were well known by the government officials who elaborated and applied them, a lack of resources and the fiscal exigencies of the state delayed the modernisation of the statistical apparatus until around the turn of the nineteenth century. Perhaps the first systematic attempt to examine the accuracy of the foreign trade series was the work of J. P. Wileman, who concluded in his *Brazilian Exchange* of 1896 that the official statistics were under-valued. Almost a century later, other scholars, including Luiz Aranha Corrêa do Lago and Gustavo Henrique Barroso Franco, provided further corrections to the series.[143] As both Corrêa do Lago and Franco argued when reassessing the Brazilian balance of payments during the nineteenth century, the correction of the foreign trade series can lead to a considerable re-interpretation of historical events.

This paper follows these attempts to correct the official series. In the previous paper, we provided a reconstruction of the export series, comparing the official prices of Brazil's principal export commodities with their corresponding international prices. The results demonstrated that there remains much work to be done with respect to the reconstruction of the official series for the nineteenth century, and much to be learnt from this exercise for Brazilian historiography. For reasons mentioned below, the official export series was found to be considerably under-valued during certain periods. The correction of the export series highlighted a key insight not adequately explored by the literature: Brazilian export growth was more positive during the post-independence period than any other time in the nineteenth century. As we argue in this paper, this result

[143] Wileman, *Brazilian Exchange*; Corrêa do Lago, 'Balança,' *O comércio exterior*; Franco, 'Balanço.'

is robust to changes in the assumptions underlining the methodology used in the reconstruction.

To our knowledge, this paper also provides the first attempt to comprehensively evaluate the official import series. The aforementioned scholars highlighted the failings of the official series and made important corrections regarding the inclusion of specie movements. Here we examine the accuracy of both the geographical distribution and value of the import series. The results show that Brazil's official import series was also under-valued during certain key periods, most likely due to the use of official prices. These results suggest that the accuracy of the official series should be at the centre of any discussion regarding the revision of Brazil's trade balance and balance of payments during the nineteenth century.

This paper also provides estimates of Brazil's export and import price indices. This is an important contribution, given that the pre-existing indices either use official price data or do not refer explicitly to the prices of Brazil's exports or imports. Instead of using official price data, we present new export and import price indices using international and domestic market price data. The case of imports is especially important, given that the literature has principally relied on Albert Imlah's British export price index to study the long-term trend of Brazil's import prices.[144] The improvement of Brazil's price indices will serve to clarify the debate regarding the secular decline in the terms of trade during the nineteenth century.[145]

The weight of the paper is necessarily placed on the accuracy and correction of the import series, as the export series has been dealt with by the authors in the previous

[144] Imlah, *Economic Elements*.
[145] Gonçalves and Barros, 'Tendências;' Leff, *Underdevelopment*; Kannebley Jr. and Gremaud, 'Secular Trend.'

paper. We re-estimate the official import series using trading partner sources and construct a new import price index for the period 1827-1913. We then reconsider the reliability of the corrected export series by questioning several of the assumptions regarding trade costs. The final section concludes with a brief discussion of the future direction of work on the Brazilian foreign trade series.

AN OVERVIEW OF BRAZIL'S HISTORICAL FOREIGN TRADE SERIES

The official series of Brazil's exports and imports begins in 1821.[146] It remains unclear what the sources were for the period from independence in 1822 to the 1840s, although the government's reliance on - and thus constant preoccupation with the calculation of – the fiscal revenues derived from the taxation of commerce resulted in the reorganisation of the customs house in the 1830s. The increased dynamism of foreign trade after independence led to organisational changes and investment in maritime infrastructure.[147] Over time, these changes seemingly generated the demand for the organisation of a statistical apparatus. In 1845, the Imperial government created the first Imperial statistical commission with the explicit intention of organising and publishing the foreign trade statistics for the fiscal years spanning the period 1830/31 to 1844/45. The commission soon admitted that the period prior to 1840 was beyond its technical reach (or, as the 1846 report of the commission drily put it, '…the elements do not yet exist to form a complete collection'), and committed itself to elaborating annual series of exports and imports by product, origin and destination.[148] To assemble the statistics on a national level, the commission relied upon the customs houses to provide the information

[146] The source for the official imports by value and exports by value and quantity series is IBGE, *Estatísticas históricas*, compiled by Gustavo Henrique Barroso Franco, which contains the series originally printed in the *Anuário Estatístico* of 1939/40 and updated to include the previously mentioned revisions by Luiz Aranha Corrêa do Lago.
[147] Brazil, *Relatorio ... 1834*, pp. 57-64.
[148] Brazil, *Proposta ... 1845*, pp. 34-36; Brazil, *Proposta ... 1847*, pp. 27-28.

on quantities, values, origins and destinations of imports, exports and internal trade. Officials complained repeatedly about the quality of the information supplied by customs houses; products of diverse qualities were often included in a single category, old official price lists were used, customs officials deliberately misreported quantities and values, and sometimes the paperwork containing this information (the *mappas parciaes)* did not arrive at all.[149] To obviate the latter problem, the commission calculated missing import and export values using the available information on fiscal revenue. The fruit of the commission's work is compiled in the *Collecção de Mappas Estatísticos do Commercio e Navegação do Império do Brasil*, of which the fiscal years 1841/42, 1842/43, 1846/47, 1848/49, and 1849/50 have been digitised.[150]

During the period encompassing the fiscal years 1853/54 to 1866/68 the Finance Ministry reported the official value of bilateral trade in its Ministerial Reports, the data being provided by the *Diretoria Geral das Rendas Publicas*. The detailed work of the first commission, however, was discontinued until 1870, when the government created a second statistical commission headed by Sebastião Ferreira Soares.[151] Much like its predecessor, the role of the second commission was to organise the country's statistics on maritime commerce that had fallen into disrepair since the 1850s.[152] Soares and team's work yielded the publication of a series of volumes of *Estatística do Commercio Marítimo do Brazil* covering the early 1870s.[153] As Gustavo Henrique Barroso Franco observed, the period from the death of Soares in 1887 to the reconfiguration of the statistical apparatus around the turn of the century by British civil engineer J. P. Wileman is *terra*

[149] Brazil, *Relatorio ... 1893*; Brazil, *Relatorio da Commissão*.
[150] See the digitised publication list at memoria.org.br.
[151] Soares (*Elementos*) provided the outlines of the organisation of the nation's statistical apparatus.
[152] Brazil, *Proposta ... 1884*, p. 39.
[153] The years 1870/71 to 1872/73 have been digitalised. According to official reports (*ibíd.*, p. 40): 'The work done by the Commission, and by the current *Repartição de Estatistica*, form 44 volumes, of which only 19 have been printed.' This work covered the period 1869/70 to 1877/78, although it is unclear which of these volumes were eventually published.

incognita as far as the origin of the available national totals of exports and imports is concerned.[154] However, government officials did show concern regarding the disorder of the country's statistics. In 1895 Honorio Alonso Baptista Franco, member of the commission for the revision of the Brazilian tariff, was sent to inspect the workings of the Rio de Janeiro customs house. In an account published in the annual report of the Finance Ministry in 1896, Baptista Franco observed that 'It is physically and morally impossible that work of such a scope … referring to not only the biggest customs house in Brazil, but also in all of South America … can be elaborated by only six employees, two of which were sometimes distracted by other tasks.'[155] Customs house officials continually justified delays in the elaboration of statistics by a lack of resources and specialised personnel.[156] In response to these calls and to cover required expenses, the government created a 'statistics tax' (*imposto de estatística*) in 1897 that provided enough revenue to cover the salary and rent expenses of the newly created *Serviço Especial de Estatística*.[157] Wileman was appointed as director of the *Serviço* in 1900, and from 1901 onwards, Brazil's trade statistics were reported annually in *Commercio Exterior do Brasil*, which, like Wileman's previous work, explicitly concerned itself with the mirror comparison of Brazil's trade records with those of its principal trading partners in an effort to improve the accuracy of the data.

The results of one such mirror comparison for the period 1902-1914, incorporating the export statistics of Great Britain, the United States and Germany, and the corresponding official Brazilian import statistics, provided grounds for celebrating the success of the modernisation of Brazil's statistical apparatus. The report concluded that

[154] Franco, 'Setor,' p. 559.
[155] Brazil, *Relatorio ... 1895*, anexo, p. 23.
[156] *ibíd.*, p. 224.
[157] Brazil, *Relatorio ... 1900*, p. 47.

'…the differences between the totals … are not important … and are sometimes even trifling.'[158] This accords with the recent evaluation of the export series, which tended towards accuracy after 1901. Nevertheless, it remains to be seen whether such conclusions apply to the nineteenth century statistics.

There are two possibilities regarding the bias of the official statistics: one concerning quantities, the other prices. The accuracy of the first may be affected by several causes, the most common being smuggling, misreporting, and incorrect classification of merchandise. If these were truly problems, then one would assume that the series would be biased downwards, as the official statistics under-report the true quantity imported. Officials were only too aware of these problems, however, and the use of specific rates (*taxas fixas*) to tax imports was justified on the grounds that they reduced the incidence of fraudulent activity.[159] The second potential source of bias concerns the official prices. These were defined principally for fiscal reasons, given that taxes on trade (mostly imports) were Brazil's principal source of fiscal revenue during most of the nineteenth century.[160] In the case of imports, tariff commissions defined the classification scheme and official price of each product based on an average of market prices. Specific rates were then calculated by applying an ad valorem tariff to the corresponding official prices.[161] Similarly, in the case of exports, the official values were fixed by a weekly price list (the *pauta*), meant to reflect the average market prices of each commodity. Customs officials used this information, together with the quantities registered of incoming and outgoing merchandise, to calculate the weight of the tax and the corresponding values,

[158] Brazil, *Commercio exterior*, p. LXX. Anna Carreras-Marín and Marc Badia-Miró ('Fiabilidad'), however, found that in the case of coal imports from Great Britain and the United States for the period 1908-1930, Brazilian records were consistently under-valued, indicating the inclusion of transit in trading partner records.
[159] Fontoura, *Documentação*, p. 47
[160] As Manuel Alves Branco observed in 1844, '…the first object of the tariff is to correct the deficit from which the country has long suffered…' *ibíd.*, p. 34.
[161] For an example of this process see the *Tabella de direitos* in Brazil, *Relatorio da Commissão*.

which were included in the *mappas* sent to the statistical agency to calculate the aggregate statistics. As we shall see below in the case of imports, these official prices were liable to diverge from market prices, whether due to strategic overvaluation for fiscal reasons, or delays in updating the official price lists.[162] From 1901 onwards, import values were listed as declared values in c.i.f. form, while export values relied principally on market prices and included export duties but not freight, insurance or landing costs.[163]

THE IMPORT SERIES

Here we seek to examine the accuracy of Brazil's official import series. The standard procedure for assessing the accuracy of the import series is to compare the official prices and quantities of Brazil's import statistics with those of its principal trading partners. Unfortunately, a complete series of official import prices and quantities do not exist, so we are unable to implement such a procedure. Instead, we estimate a new import series based on the existing partner statistics and compare this to the official series. Thus, the methodology adopted here is to take the sum of the trading partner statistics and to add a 'residual' that corresponds with the percentage of imports not covered by our trading partner sample. The coverage is calculated as the percentage of each trading partner in total import value according to official Brazilian sources. As previously mentioned, we possess only a broken series of bilateral observations from Brazilian sources for the nineteenth century, including the information compiled in the *Collecção de Mappas Estatísticos*, the bilateral data published in the *Relatorios* of the Finance Ministry, a set of years from the *Estatística do Commercio Marítimo*, and the period from

[162] Rui Barbosa, writing in the 1889/90 annual report of the Finance Ministry observed that '…almost always the national products exported and foreign products imported are sold ... at higher or lower prices than those calculated and used by the customs houses to collect customs duties. Thus, one cannot trust the value of imports and exports of this country listed in the statistical tables of commerce and navigation…' Brazil, *Relatorio ... 1890*, p. 341.
[163] Brazil, *Commercio exterior*, p. XXI.

1901 onwards given in *Commercio Exterior do Brasil*. We fill in the gaps by taking several benchmark years for imports into Rio de Janeiro from the *Mappas estatísticos do commercio e navigação do Porto do Rio de Janeiro*.[164] Furthermore, we add a benchmark for Rio de Janeiro in 1836 from Sturz .[165] We assume that the geographical distribution of imports into Rio de Janeiro was representative for these benchmark years. For those periods in which the geographical distribution of imports is not available, we construct a time series by way of interpolation. We additionally assume that interpolation is an acceptable practice in this context given that there were no sudden changes in the geographical composition of Brazil's imports. To this effect, we use data from eight of Brazil's principal trading partners (Great Britain, the United States, France, Spain, Portugal, Chile, Belgium and Hamburg/Germany), adjusted for insurance and freight costs. Table 3.1 displays the descriptive statistics of this sample. Unfortunately, for the first five years of the period (1821-1826) we can only include the United Kingdom and the United States. However, these two countries alone constituted around 54 per cent of Brazil's imports by value. Over the following few decades the sample expands to include eight countries and to represent over 90 per cent of Brazil's imports by value.

We construct the new import series using the formula:

$$M_{br,t} = \sum X_{i,t} \left(\frac{1}{\sum c_{i,t}}\right)$$

Where Brazil's imports (*M*) in year *t* are calculated by taking the product of the sum of the exports (*X*) of each trading partner *i* in the sample and the inverse of the sum of the percentage of trading partner c*i* in total import value.

[164] Rio de Janeiro, *Mappas estatísticos*.
[165] Sturz, *Review*, p. 100.

Table 3.1. *Trading partner sample and temporal and import value coverage, Brazil, 1821-1913*

Country	Period	Missing years
United Kingdom	1821-1913	
United States	1821-1913	
France	1827-1913	
Hamburg	1831-1856	38
Belgium	1834-1913	
Portugal	1837-1913	38-41, 45-47, 49-50, 52-54, 57-60, 62-64
Chile	1843-1913	49, 55, 69, 07
Spain	1849-1913	69
Germany	1880-1913	

Coverage	Year	% Total import value
Min.	1821	54
Mean	1821-1913	76
Median	1821-1913	77
Max.	1880	94

Sources: Belgium, *Tableau*; France, *Tableau*; Chile, *Estadística*; Germany, *Statistisches*; Hamburg, *Tabellarische*; Lains & Silva, 'Foreign trade;' Spain, *Estadística*; United Kingdom, *Tables*; United Kingdom, *Annual statement*; United States, *Commerce and Navigation*. Complemented by data taken from RICardo database, see http://ricardo.medialab.sciences-po.fr/#/; Dedinger and Girard, 'Exploring.' Exchange rates from Federico and Tena-Junguito, 'World Trade.' Coverage taken from Brazil, *Collecção*; Brazil, *Estatistica*; Rio de Janeiro, *Mappas estatísticos*; Brazil, *Commercio exterior*; Sturz, *Review*.

When attempting to estimate the import series, an important assumption is the size of the freight factor. Like the export series, existing outgoing freight data (from Europe and the United States) either does not cover the whole period under study, is for destinations other than Brazil or does not cover the entire composition of Brazil's imports. For these reasons, again, like the export series, we calculate a lower and upper bound estimate of the freight factor used to adjust the partner statistics from c.i.f. to f.o.b. values. The lower bound is the weighted average of the freight factor of 11 of Brazil's principal import commodities.[166] A number of these freights are for different routes and are adjusted for the corresponding distance differential. Furthermore, we chain several of these series to existing freight indices to overcome the problem of temporal coverage.

[166] These commodities include beer and ale, coals, cotton manufactures (plain, printed, dyed, bleached and unbleached), beef (salted or cured), wheat flour, iron bars, and petroleum. The sources are Harley, 'Ocean freight rates;' Mohammed and Williamson, 'Freight rates;' Jacks and Pendakur, 'Global trade.'

The lower bound factor ranges from six to 15 per cent, averaging 12 per cent over the period. Although freights were generally higher than 12 per cent of the import price, especially for the period before the dominance of steam, this estimate is biased downwards by the preponderance of cotton manufactures in Brazil's import composition and the corresponding low freight factor of this product. The upper bound estimate attempts to balance this downwards bias by taking an unweighted average of the same sample of commodities. The upper bound factor ranges from 18 to 30 per cent, averaging 23 per cent. Estimates of the freight factor given in *Commercio exterior do Brasil* for the period 1901-1914 lie in between our lower- and upper-bound estimates.[167] We also assume a two per cent insurance cost, in line with existing data for the period.[168]

A further consideration is the inclusion of transit trade in the trading partner records. Given that Brazil, and especially Rio de Janeiro, was an important port of call for the transit trade, the geographical assignment of the partner series to Brazil may include commodities ultimately destined for the Rio de la Plata.[169] If this is the case, the geographical distribution of Brazil's imports should appear as under-valued when compared to the trading partner statistics. On the other hand, the Argentine and Uruguayan statistics, where available, should be over-valued when compared to the corresponding partner records. We test this hypothesis by running a mirror comparison of the sums of the value of exports of the Rio de la Plata's principal trading partners with the official values listed in Brazilian, Argentine and Uruguayan sources. We include the trading partners mentioned previously, excepting Portugal for which we lack sufficient bilateral data in the case of Uruguay. We adjust these partner records by the lower-bound

[167] Brazil, *Commercio exterior*, pp. 9-13.
[168] Llorca-Jaña, 'To be waterproof;' Schöller, 'L'évolution.'
[169] For example, the British geographical assignment of exports did not register the country of final destination until 1904. Prior to this year, it only registered the country to which exports were directly shipped. Stafford et al., 'United Kingdom,' p. 290.

freight factor and insurance estimate as described above. As previously mentioned, the construction of a continuous time series is restricted by the paucity of sources. Although this prevents us from undertaking a precise evaluation of the accuracy of the geographical distribution of Brazil's bilateral series, it allows us to evaluate the degree and tendency of the bias in the statistics. An additional restriction is the temporal coverage of Argentine and Uruguayan official sources: these are limited until the period from 1870 onwards. We have extended the Argentine series by using import data for Buenos Aires for several years. This is justified by the fact that Buenos Aires was the principle Argentine receiving port for trade during these years.[170]

Figure 3.1 displays the results of our test of geographical distribution. Although it is difficult to draw conclusions due to the paucity of data, it is not immediately obvious that trading partner statistics were overwhelmingly biased by the misspecification of exports. To begin with, the period when Brazil's geographical distribution tends toward under-valuation (seemingly from 1862 until the reorganisation of the statistical apparatus around the turn of the century) corresponds with the under-valuation of the Argentine and Uruguayan records. The only period that may lend weight to the argument is the 1890s, when both the Argentine and Uruguayan records were around 20 per cent over-valued with respect to partner records. Unfortunately, we only possess official Brazilian bilateral data from 1899 onwards, and thus are unable to confirm or reject this hypothesis for this period. For the purposes of our re-estimate, however, we assume that the trading partner statistics are not biased beyond remedy by the incorrect specification of the geographical distribution of exports.

[170] Buenos Aires accounted for 81 per cent of imports in 1864, according to official sources. Argentina, *Rejistro*, p. 331.

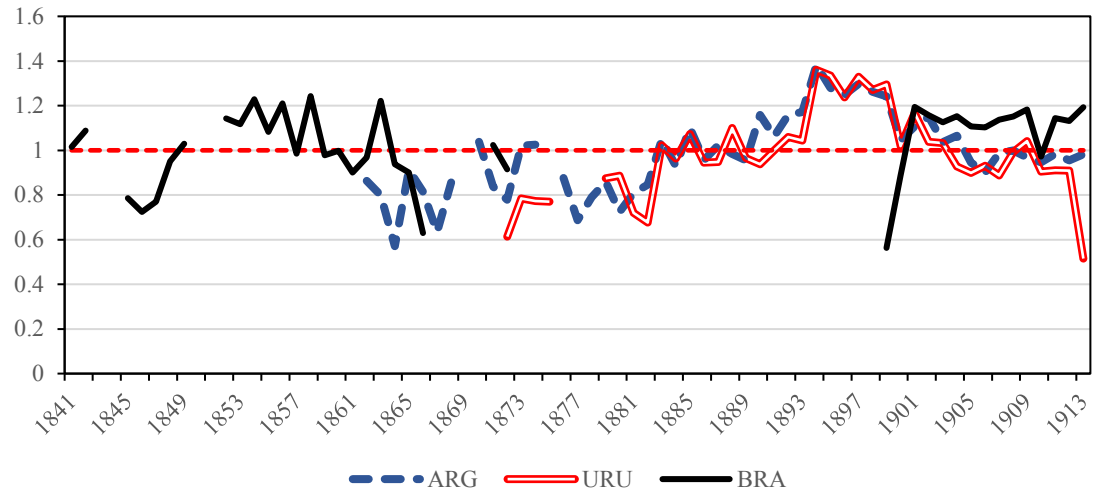

Figure 3.1. *Accuracy test of geographical distribution of imports, Brazil, Argentina, Uruguay, 1841-1913 (1=Accurate)*

Notes: Full series p. 272. *Sources*: same as Table 3.1.

An additional question concerns the inclusion of foreign re-exports. Re-exports were an important component of the exports of Brazil's principal trading partners. In the case of the United States, re-exports averaged around 17 per cent of the country's total exports to Brazil during the period 1821-1850, declining to an average of two per cent during the rest of the century. Great Britain's exports of colonial and foreign merchandise accounted for a lesser share, averaging four per cent of exports from 1854 to 1913. The value of the French *commerce général*, which included both French and foreign exports, was 38 per cent higher on average over the century than France's exports of domestic merchandise, or *commerce spécial*.[171] A key question is whether the official series reflected these additional trade flows. The period before the modernisation of Brazil's statistical apparatus around the turn of the century is ambiguous, given the general paucity of information regarding the elaboration of the import series. The introductory notes to

[171] We do not adjust the French *commerce général* for the inclusion of transit trade. While there is a risk of double counting, the proximity of our re-estimate to the official series during the period 1901-1913 shows that the transit trade occupied a minor share of total French exports.

Table 3.2. *Ratio of official Brazilian import series to re-estimate under alternative assumptions, 1821-1913*

Assumption:	Weighted (lower bound) freight factor	Unweighted (upper bound) freight factor	Weighted (lower bound) freight factor & re-exports
1821-1850	0.98	0.83	0.88
1850-1870	1.08	1.00	0.95
1870-1890	0.98	0.87	0.89
1890-1913	1.08	0.99	0.99
1821-1913	1.02	0.91	0.92
1850-1913	1.05	0.95	0.94
1870-1913	1.08	0.99	0.94

Sources: see Table 3.1.

the *Collecção de Mappas Estatísticos* defined general imports as including '…all categories and merchandise of foreign production and manufacture imported directly from the country of origin' ('*dos propios paizes'*).[172] A similar definition appeared in Soares' glossary included in the *Estatística do Commercio Marítimo*.[173] After 1901, the Brazilian import statistics explicitly included '…both direct imports, and those that arrive in transit from other countries.'[174] Here we seek to confirm whether re-exports were included in the official imports series. If so, then the official series should be over-valued when compared to our estimate without re-exports. Likewise, the addition of re-exports to the trading partner statistics should bring our estimate closer to parity with the official series. We include the re-exports of the above-mentioned three countries, given their primacy as trading partners and the availability of data on re-exports for most of the period under question.

Table 3.2 shows the ratio of the official import series, at current prices, to our re-estimate, considering the above-mentioned issues. We present the ratio adjusted for a) the

[172] Brazil, *Collecção*.
[173] Brazil, *Estatistica*.
[174] Brazil, *Importação e Exportação*.

weighted, or lower bound, estimate of the freight factor, b) the unweighted, or upper bound, estimate of the freight factor, and c) the latter as well as the inclusion of re-exports from the United States, Great Britain and France. For the whole period (1821-1913), the official series is surprisingly accurate. The results, however, indicate a certain degree of under-valuation during most of the nineteenth century. This is especially evident when re-exports are included. As expected, the new estimate corresponds closely to the official series after 1901, reflecting the improved accuracy of the Brazilian statistics.

Figure 3.2 displays the official series alongside the sum of our trading partner series and the re-estimate including the lower-bound freight factor and re-exports, in current US dollars. Since the coverage of the sum of our sample of trading partners does not reach 100 per cent, this sum should always lie below the official series. With few exceptions, however, we observe that this is not the case. The degree of under-valuation of the official series is particularly notable during the period immediately following independence (1822-40), and during the period spanning the Paraguayan War (1864-70) to the fall of the Empire and founding of the First Republic (1889).

Here we briefly explore two possible explanations for the under-valuation of the official series, one concerning quantities, the other official prices. The former may be under-counted due to the presence of contraband. While contemporary reports suggest that certain regions, such as Rio Grande do Sul, were characterised by an active contraband trade, it is difficult to calculate precisely what percentage of total trade this represented.[175] In the case of Rio Grande do Sul, the nature of the local economy

[175] See Brazil, *Proposta ... 1874*, p. 69. The Rio Grande customs house was also the subject of a scandal in the nineties when it was found that a clerk and dispatcher for various merchant firms had defrauded the public treasury '…by classifying goods with a high tax as those with a low tax, by manifesting goods liable to duty as samples of little or no value, by giving a fictitiously low value to those goods which are liable to *ad valorem* duty, and by declaring false weights of packages.' See *Rio News*, September 3rd, 1895, p. 4. See also the discussion in Brazil, *Relatorio da Commissão*, pp. 92-101.

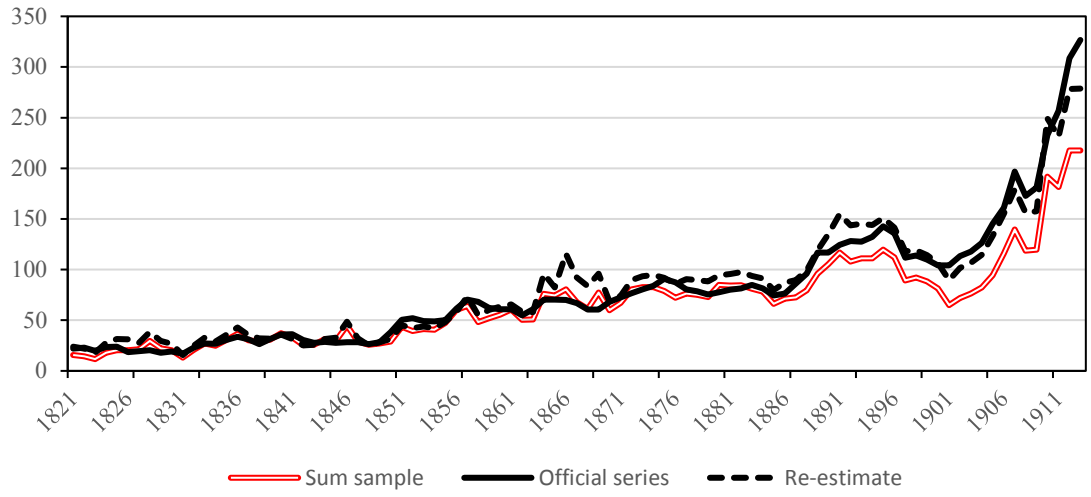

Figure 3.2. *Sum of trading partner samples, official import series, and re-estimate of total imports, current prices, in millions of US dollars, Brazil, 1821-1913*

Notes: Full series p. 274. *Sources*: Sum sample and new estimate: see Table 3.1; official series: IBGE, *Estatísticas históricas*.

determined that smuggling focused predominantly on cattle rustling.[176] While important on a local level, it is likely that the impact on aggregate statistics would be small. Moreover, the under-valuation of the import series suggests a more systematic explanation that lies in the procedure used to elaborate the statistics, rather than quantities missing due to the contraband trade. The use of partner statistics effectively obviates the problem of contraband by including what might be missing trade on the Brazilian side.

The second explanation that official prices were the principal determinant of the observed under-valuation is evident in contemporary reports on the elaboration of the country's tariff schedule. In fact, it seems that official prices were only changed by infrequent tariff commissions. A tariff commission report in 1871 observed that 'The tariff that currently regulates the collection of customs house revenues, with a few small exceptions, is that of 1860 … Not having elevated the official prices, and raising them

[176] Flores, 'Contrabando;' Pereira, 'Was it Uruguay,' p. 9; Bonino-Gayoso et al., 'Uruguay,' p. 18.

alongside events in the market, resulted in … a percentage of fiscal revenue less than the rightful amount…' Citing the report, the Viscount of Rio Branco recommended that the situation be rectified by way of the updating of official prices.[177] The issue was not only one of official prices, but also of the corresponding classification scheme, as Francisco Belisario Soares de Souza argued in his report to the Finance Ministry in 1887: 'Effectively, since the last tariff was enacted [in 1881] … the industrial method of production of certain products has undergone important transformations … rest assured that it is not small the number of official prices … that presently diverge from the real average market price of the products to which they correspond…'[178] Given that (until 1901) the values that appear in the available sources for import by product are aggregates of such official prices, we are able to test this hypothesis by comparing the trend of official import prices against that of corresponding trading partner export prices.[179] If official import prices were fixed for long periods, then this should appear in the evolution of these prices over time when compared to trading partner export prices.

Figure 3.3 compares the official prices of six commodities with the corresponding prices of the principal supplier of that commodity. We include cotton manufactures (plain and printed or dyed), dried and salted codfish, and coals from Great Britain, wheat flour from the United States, and beef jerky from Uruguay. In the cases of wheat flour, coals, codfish and beef jerky it is evident that, until the turn of the century, official prices remained fixed and did not reflect the trend of international prices. What's more, perhaps apart from coals, the official prices of these commodities remained under-valued for much of the century. From 1901 onwards, however, the prices of these commodities (reflecting the declared value instead of the official value) changed according to fluctuations in

[177] Fontoura, *Documentação*, pp. 60-61.
[178] *ibíd.*., p. 84.
[179] This 'price' is technically the unit value.

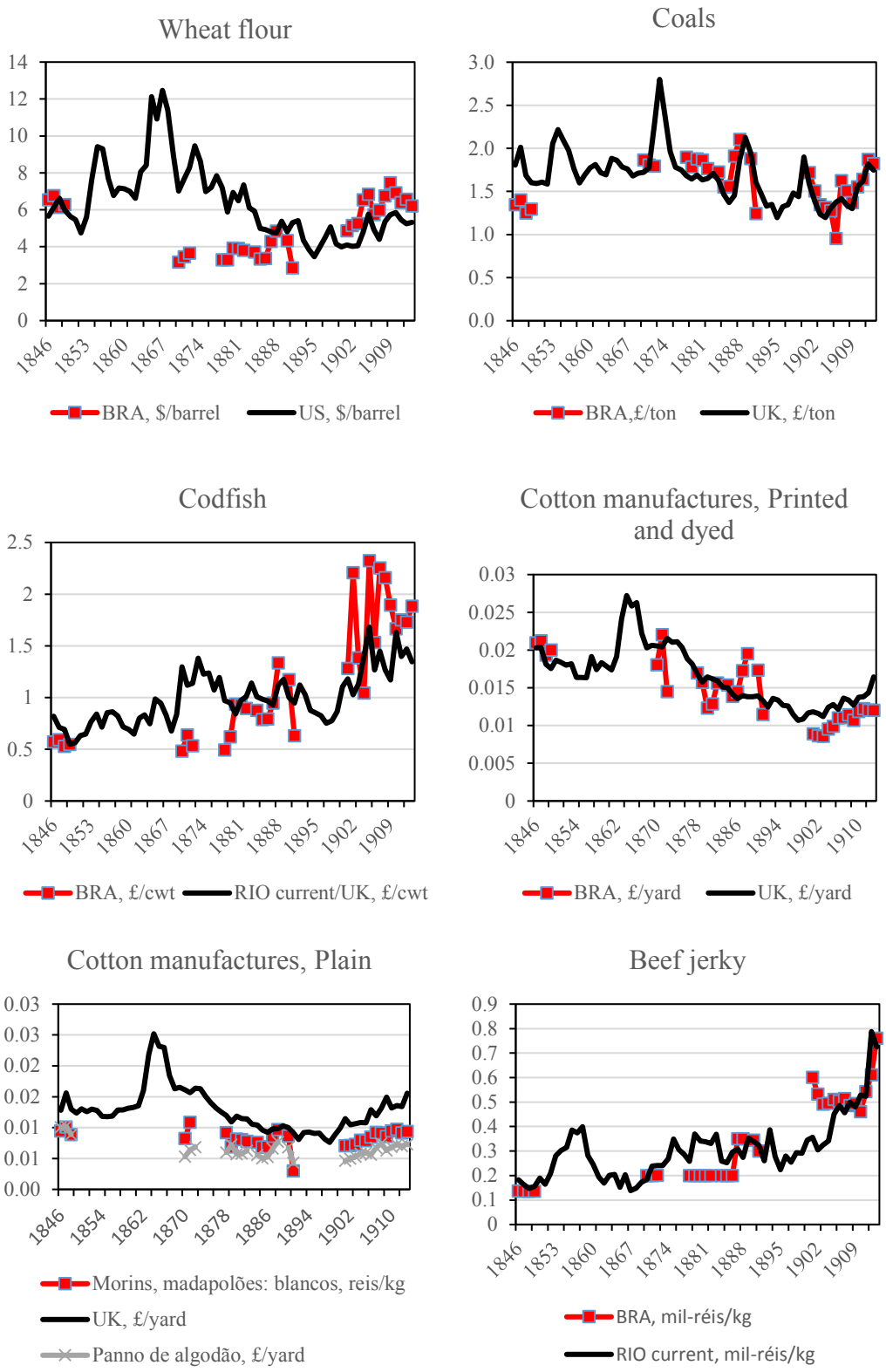

Figure 3.3. *Official import prices and trading partner export prices of six import commodities, 1846-1913*

Notes: Full series p. 279. *Sources*: BRA: Brazil, *Collecção*; Brazil, *Estatistica*; Brazil, *Annuario estatistico*. US: United States, *Commerce and Navigation*. UK: United Kingdom, *Tables*; United Kingdom, *Annual statement*. RIO: *Jornal de Commercio*.

international prices, and the strong degree of under-valuation that characterised the previous century disappeared. In the case of the official prices of cotton manufactures, while these also showed fixed properties, they seem to exhibit more frequent fluctuations. However, this could simply reflect changes in the composition of this import category (which included multiple types of cotton textiles) rather than alterations in the official price. In any case, it is clear that the trend and level of the official prices used to calculate the official statistics aid us in understanding the under-valuation of the official import series.

THE EXPORT SERIES

As mentioned above, the historiography of Brazil's export economy during the nineteenth century has been primarily based on the official statistics, calculated using a list of official prices (the *pauta*) that was based on the average of market prices. In the previous paper, we showed that the official prices, when compared to corresponding international prices, were generally under-valued. This under-valuation was found to be greater during the decades following independence. We then went on to correct the official series using international prices and official quantities, adjusting the international price by subtracting trade costs. The results revealed a dynamic post-independence period. Figure 3.4 displays the corrected and official series in current United States dollars.

When undertaking these corrections, we made several assumptions regarding the weight of trade costs that are sensitive to the data being used. Specifically, we rely on estimates of freight rates and export taxes that are perhaps not totally representative. Here we confront each of these issues in turn.

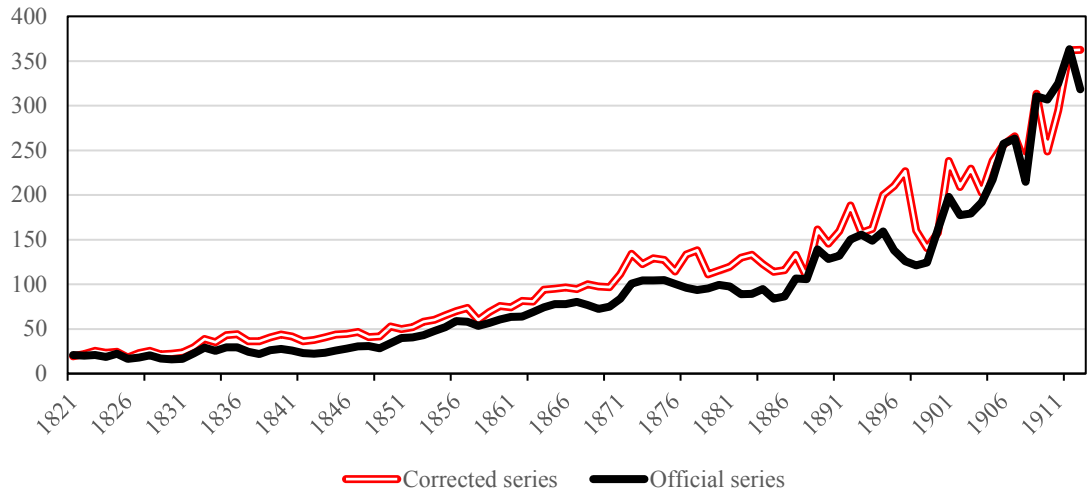

Figure 3.4. *Total exports, corrected and official series, current prices, millions of US dollars, Brazil, 1821-1913*

Notes: Full series p. 281. *Sources*: Appendix 2.1; IBGE, *Estatísticas históricas*.

For the period before 1870, there is a general scarcity of freight rate data for Brazil. Juan Oribe Stemmer's seminal study of Latin American freights during the nineteenth century included Brazilian coffee, although only provided a graphical series for the North American route and from 1845 onwards.[180] Other authors provided other series, but with varying degrees of temporal, commodity and geographic coverage.[181] To cover the first two decades of the post-independence period, we used Paul Schöller's index for freights from Antwerp to Rio de Janeiro, referenced by freight rate data for Brazil from various sources.[182] However, the use of Schöller's index may exaggerate the average level of rates when other routes are included. Antwerp, although an important destination for Brazil's products, was by no means the only destination. Furthermore, Schöller's was an outgoing index, and thus may be unrepresentative of the commodity composition of homeward freights for Brazil's commodities. As the freight rates were deducted from the

[180] Stemmer, 'Freight rates.'
[181] See, for example, Angier, *Fifty years'*; Klovland, 'New Evidence;' Harley, 'Ocean freight rates.'
[182] Schöller, 'L'évolution.'

international prices used to reconstruct the new exports series, the use of our previous freight series might have served to distort the correction of the official export series, and thus the calculation of the growth rates that our argument hinged upon.

To test the robustness of our original correction, we have constructed a new database of freight rates from Brazilian primary sources.[183] The new database consists of monthly observations of freights from Brazilian to foreign ports for Brazil's principal export commodities. The data from the period before 1840 is less frequent although it is sufficient to construct an average that reflects the level and trend of prices. For coffee, we include quotations from Rio de Janeiro to Liverpool, London, Hamburg, Le Havre and Marseilles; the rates for sugar are from Rio de Janeiro, Pernambuco and Bahia to Liverpool, the British Channel, Hamburg and Le Havre; cotton quotations are from Rio de Janeiro, Pernambuco and Maranhão to Liverpool, Le Havre and Lisbon; and quotations for hides are from Rio de Janeiro and Pernambuco to Liverpool.

Figure 3.5 displays the arithmetic average of the available routes for each year for the three commodities, alongside the original series used to convert the international prices from c.i.f. to f.o.b. values. In the cases of coffee and hides, it is evident that the use of Schöller's series exaggerates the average level of freights, especially during the first decade of independence, although the series converge with the original estimates around mid-century. The original sugar series, however, under-values the true level of average

[183] The sources are: *A Patria*, *A União*, *Correio Mercantil, Correio Paulistano, Diario de Maranhão, Diario Mercantil, Diario de Pernambuco, Diario de Rio de Janeiro, Jornal de Commercio, Jornal Maranhense*, *Lidador, O Constitucional*, *O Correio da Tarde*, *O Cruzeiro*, *O Despertador*, *O Diario Novo*, *O Liberal*, *O Liberal Pernambucano*, *O Mercantil*, *O Observador*, *O Paquete do Rio, O Pharol Constitucional, O Porto-Franco*, *O Progresso*, *O Rio Grandense*, *O Sete d'Abril*, *Publicador Maranhense*, and *Rio Mercantile Journal*. The corresponding years of each source are included in the bibliography. These sources are available in the Hemeroteca Digital of the Brazilian National Library (http://bndigital.bn.br/hemeroteca-digital/), and freight rates were located by way of Boolean searches.

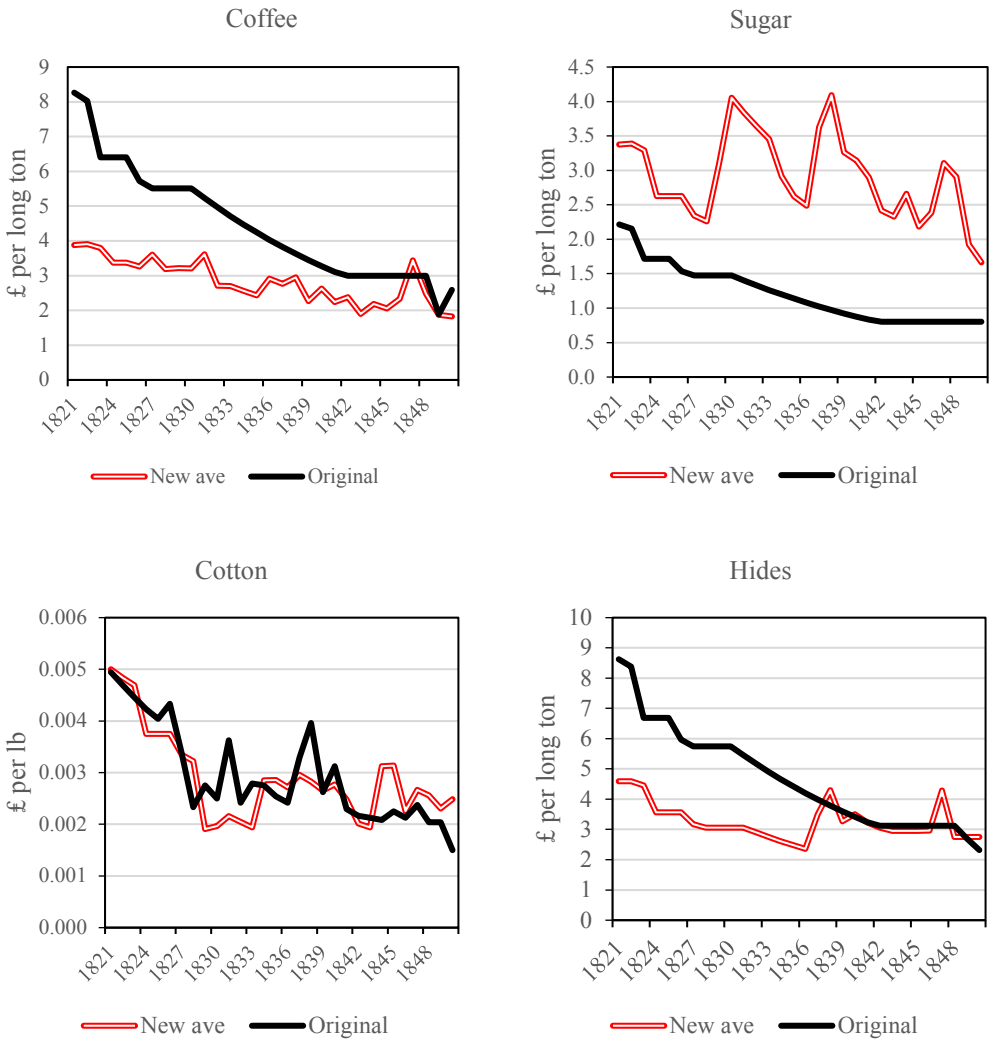

Figure 3.5. *Original and new freight rate series for selected export commodities, Brazil, 1821-1850*

Notes: Full series p. 286. *Sources*: Original: Appendix 2.1; New ave.: see footnote 183.

freight rates. The difference in the tendencies and levels of the two estimations for the cotton series is trifling.

A second point is the weight of export taxes. The original estimate used the export tax average (export tax fiscal revenue/total export value in current prices) as a proxy for taxation rates. This approach, however, disregards the provincial rates that were also charged on exports, most of which were higher than the Imperial government rates. The current price list given in the *Correio Mercantil* of 1827, for example, listed an export tax

from the port of Rio de Janeiro for coffee of eight or nine per cent (the *dízimo*), depending on origin ('Serra acima' or 'Serra abaixo'), plus 80 réis per arroba (equal to two to three per cent of the average market price) if the average price dropped below 4000 réis/arroba, two per cent otherwise. Thus, the total weight could sum to 12 per cent of the market price, much higher than the 3.6 per cent implied by the fiscal data for that year. The same can be observed for sugar and cotton exports from Pernambuco in 1840, which were 10 and 12 per cent, respectively, higher than the 7.1 per cent given by the export tax average.[184] The ideal solution to this problem would be an average for the provincial export taxes for each commodity weighted by principal exporting regions. Data scarcity prohibits us, for the moment, from elaborating such a series. We thus add an additional 15 per cent to the export tax average, resulting in an average of 20 per cent per annum for the period from 1821 to 1850. We also consider the possibility that export taxes were included in the final prices. In the commodity chain from plantation to port, producers were subjected to export taxation before the product was sold to the export houses. This would indicate that the market prices that the official prices were based upon already included the export tax. Although the evidence indicates otherwise, it is also useful to provide an estimate without taxation to show their impact on growth.

Using these revised data and assumptions, we re-estimate the growth rates to ascertain whether the overall results and subsequent historical interpretation of Brazil's export growth are sensitive to these assumptions. Here we present three growth estimates: estimate A is the original as presented in the previous paper, estimate B includes the new freight series and higher export taxes, and estimate C includes the new freight series but

[184] *Diario de Pernambuco*, Jan. 15th, 1840.

Table 3.3. *Export growth rates (%), per annum, under alternative trade cost assumptions, constant 1913 prices, Brazil, 1821-1913*

Estimate:	A Original	B New freights, high tax	C New freights, no tax
1821-50	5.89	5.94	5.95
1821-70	4.55	4.57	4.59
1821-90	3.57	3.57	3.58
1821-13	3.70	3.73	3.72
1850-70	2.82	2.80	2.84
1850-90	1.99	1.96	1.97
1850-13	2.77	2.79	2.78
1870-90	1.27	1.23	1.21
1870-13	2.81	2.86	2.82
1890-13	4.28	4.39	4.34

Sources: Export value: Appendix 2.1; Freights: see footnote 183.

does not include export taxes. As can be seen in Table 3.3, changing the assumptions for the initial period does not radically change the story. In fact, the revised series with higher taxes and the new freight series is almost identical to the original estimate, since freights for coffee have been reduced by a larger factor than taxes have been increased. In the year 1821, for example, our export tax rate has been increased by 15 per cent, while the freight for coffee has been reduced from 8.3 to 3.9 pounds per ton, a reduction of 53 per cent. Estimate C demonstrates that growth rates were not particularly sensitive to changes in the size of the trade cost factor. Figure 3.6 displays the levels of the three estimates in current US dollars. In this context, estimates B and C can be interpreted as lower and upper bound estimates, respectively. While the different assumptions do not change the story in terms of constant prices, there is considerable divergence in terms of current prices during the period 1860 to 1890. In fact, the lower bound estimate closely corresponds with the official series during this period. Thus, the altering of these assumptions might seriously affect the interpretation of indicators requiring the use of current values during this period (such as the trade balance). The results for the post-

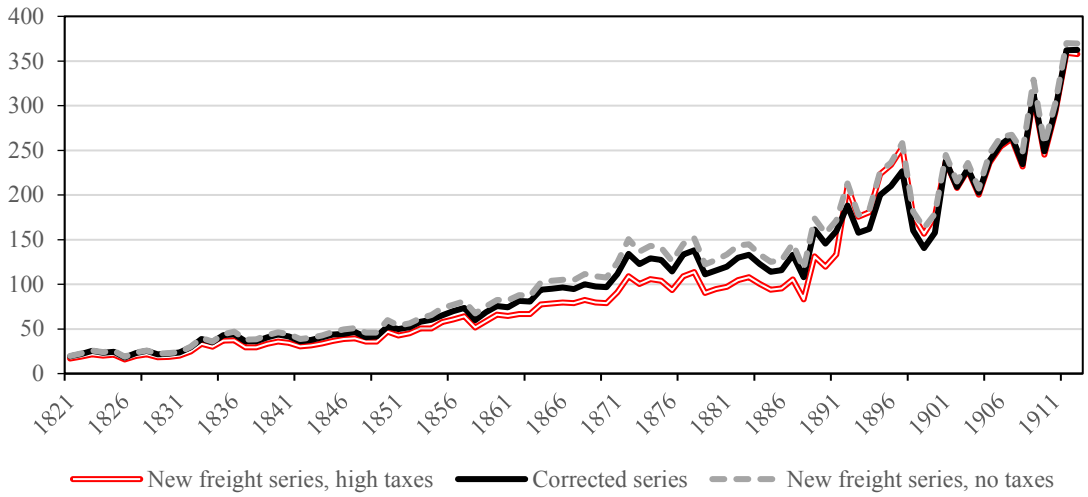

Figure 3.6. *Total exports, under alternative trade cost assumptions, current prices, millions of US dollars, Brazil, 1821-1913*

Notes: Full series p. 291. *Sources*: Same as Table 3.3.

independence period to 1860 and the first decade of the First Republic, however, remain considerably different from the official series.

Of course, any exercise in the reconstruction of historical statistics must make assumptions based on the availability and reliability of the empirical evidence at hand. Accounting of this sort should not be interpreted as a precise calculation, but rather as being merely indicative of the actual trend. It is evident, however, that the post-independence period was the most dynamic in terms of export growth in nineteenth century Brazil. This dynamism extended until the mid-century but disappeared alongside the consolidation of the coffee sector. This result is robust to the assumptions made regarding the adjustment of international prices used to correct the under-valued official series. It remains the work of scholars to explore the significance of these results.

PRICE INDICES

Here we review the work performed on price indices for Brazil's export commodities and introduce a new import price index. Figure 3.7 displays three estimates

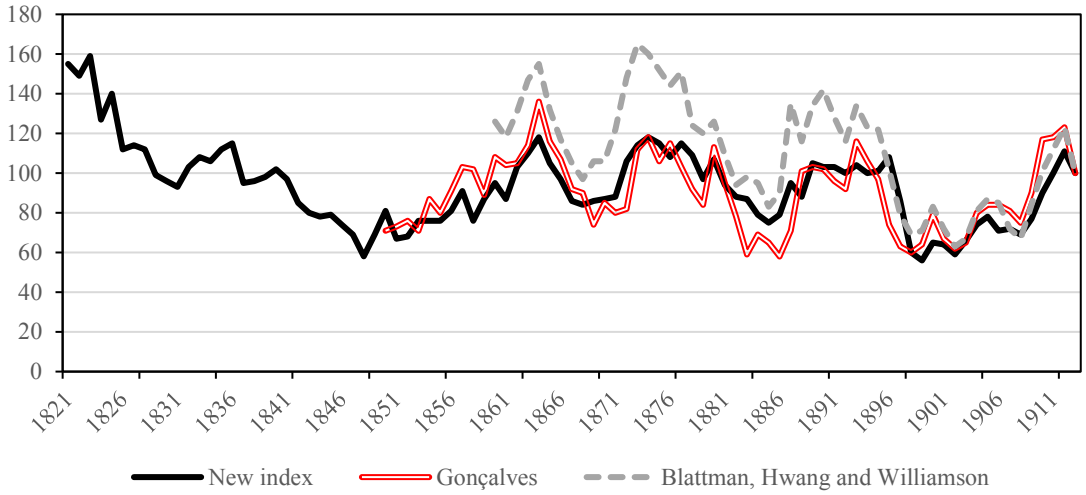

Figure 3.7. *Export price indices (1913=100), Brazil, 1821-1913*

Notes: Full series p. 294. *Sources*: Appendix 2.1; Blattman et al., 'Winners;' Gonçalves, 'Índices.'

of Brazil's export price index. The first, presented in the previous paper, is a Fisher index spanning the period 1821-1913 that uses the corrected prices of a sample of six of Brazil's principal export commodities (cacao, coffee, cotton, hides, rubber and sugar) and moving weights, as outlined in the previous section. The second, constructed by Reinaldo Gonçalves, is also a Fisher index for the period 1850-1913 that uses the official unit values of eight commodities (cacao, coffee, cotton, herva mate, hides, rubber, sugar and tobacco) and moving weights.[185] The third, an index commonly used in the literature on export growth presented by Christopher Blattman, Jason Hwang and Jeffrey Williamson, is a chained Laspeyres index for the period 1860-1913 that uses the British c.i.f. unit values and a sample of five commodities (cocoa, coffee, cotton, rubber and sugar) and fixed weights, changing every 20 years.[186] We present each index to compare the aggregate price trends generated using differing methodologies.

[185] Gonçalves, 'Índices.'
[186] Blattman et al., 'Winners.'

Despite being constituted by a reduced commodity composition, the new index is unique in the sense that it covers the entire period. Furthermore, the omission of tobacco and herva mate does not change the overall tendency of the price index, due to the overbearing weight of coffee and, later, rubber in the commodity composition. Overall, Brazil's export price index declined from a century-long high generated by the Napoleonic Wars to follow the cyclical price trend of coffee until the crisis of oversupply in the 1890s.

Regarding the import prices, we elaborate a new index using the international price data available for Brazil. This is especially constructive for the period before 1850, for which much of the previous work has relied on the general British export price index constructed by Albert Imlah.[187] The most widely used index for the period from 1850 to 1913 is that elaborated again by Reinaldo Gonçalves, who constructed a Fisher index using British exports to Brazil.[188] However, the commodity composition of Gonçalves' index was not specified. This is important when the issue of quality is considered. The official British sources of bilateral trade include general categories such as machinery and cotton manufactures that incorporate a wide range of heterogeneous commodities. The use of such aggregate categories thus forsakes homogeneity in the interests of commodity coverage. Changes in the composition of these categories might distort the index by exaggerating or understating the weights of such categories in the overall index. Furthermore, as previously stated, Great Britain was not Brazil's only trading partner during the nineteenth century. Important commodities such as wheat flour and beef jerky

[187] Imlah, *Economic Elements*, pp. 94-98. See, for example, Leff, *Underdevelopment*, Chap. 5; Goldsmith, *Desenvolvimento*, p. 31.
[188] Gonçalves, 'Índices.' Gonçalves presents three indices for the periods 1850-1913, 1914-1945, and 1946-1979. This followed on from Hélio Schlittler Silva's work, which spanned the period 1901-1950, using official sources. Silva, 'Índices.'

were sourced almost exclusively from other markets (the United States and Uruguay, respectively).

We thus construct an index for the period 1827 to 1913 using three principal sources: the British and American bilateral data available from official sources, and current wholesale prices of imported goods listed in contemporary Brazilian periodicals. The index begins in 1827 as the declared values and quantities of British exports to Brazil are unavailable for most commodities before this year. We forsake commodity coverage for homogeneity to capture the long-run price movements of a select sample of homogeneous products. This is, however, only a problem after the turn of the century when the commodity composition of Brazil's imports diversified considerably. Apart from the current wholesale prices, we then adjust for freight and insurance costs. Our final index includes a minimum of 10 and a maximum of 16 products, accounting for between 50 (in 1841) and 27 (in 1913) per cent of Brazil's import value.[189] As weights, we use a series of benchmarks of import values by product from the abovementioned official sources. Table 3.4 displays the weighting system and the percentage of the sample in total import value. As we do not have a time series of weights, we construct a series of chained

[189] While the historiography is replete with examples of the reconstruction of export statistics, the same cannot be said for imports. Examples of the meticulous reconstruction of the import series using unit values and market prices are very scarce. In the case of Spain, both Tena-Junguito ('Reconstrucción,' p. 94) and Prados de la Escosura ('Serie anual,' p. 100) attempted to reconstruct the import series, obtaining a sample coverage of 26 and 29 per cent of the value of imports, respectively. Our final benchmark falls within this range, and the scale and complexity of the task at hand prevents a larger sample coverage at this stage. Concretely, the low coverage of our final benchmark is principally due to the omission of iron and steel manufactures and machinery from the composition of the index. The omission of these categories is the unfortunate consequence of the paucity of a homogenous series of prices. The statistics of the principal suppliers of these commodities (France, Germany, the United Kingdom and the United States) either present the quantities and values of aggregated product categories (thus, failing our criteria of homogeneity), or only present the values of specific products (such as sewing machines or agricultural implements, in the cases of the United Kingdom and United States), making it impossible to calculate unit values. As mentioned in the text, however, the Gonçalves series includes the aggregated series of British iron and steel manufactures and machinery and coincides with our estimate precisely when imports of these products were at their peak during the period under analysis.

Table 3.4. *Weighting system for import price index, % of total import value, Brazil, various years*

	1841/42	1849/50	1871	1890	1901	1913
			Manufactures			
Cotton manufactures, white or plain	37.8	38.7	30.8	17.5	5.5	7.4
Cotton manufactures, printed or dyed	33.9	26.8	32.9	13.3	17.4	14.1
Spermaceti candles	0.6	1.1	0.5	0.4	-	-
Iron bars	2.1	3.4	1.4	2.2	1.0	2.1
Iron rails (for railways)	-	-	0.5	3.0	2.6	12.7
Total	74.4	70.0	66.1	36.4	26.5	36.3
			Foodstuffs			
Wheat flour	12.0	18.6	7.3	5.6	18.6	11.7
Beef jerky	6.0	1.9	9.9	29.4	21.2	4.0
Codfish	3.6	2.3	2.7	3.3	7.3	9.2
Beer and ale	1.5	1.0	1.7	1.5	0.3	0.2
Beef, salted or cured	1.5	1.9	0.6	0.1	0.4	0.3
Lard	-	0.2	0.3	6.5	3.1	0.2
Total	24.6	25.9	22.5	46.4	50.9	25.6
			Raw materials			
Coals	0.9	4.0	8.2	12.2	16.3	22.0
Cement	-	-	0.9	1.8	1.3	8.0
Petroleum/Kerosene	-	-	2.3	3.0	5.1	8.1
Total	0.9	4.0	11.4	17.0	22.7	38.1
% of total import value	50.3	43.8	45.9	38.2	41.2	27.2

Notes: After 1888 the nomenclature of cotton manufactures changes to 'bleached,' 'unbleached,' 'dyed' and 'printed.' In order to maintain a homogenous series, we have maintained the series 'white or plain' and 'printed or dyed' by averaging the prices of 'bleached' and 'unbleached' for the former and 'printed' and 'dyed' for the latter. The generic category 'coals' includes coke and cinders, which have been removed for the period 1833-1913 when differentiated data becomes available. The British series of iron bars begins in 1854; we thus chain the series with the available series of Rio de Janeiro current market prices for the earlier period. The prices for Petroleum/Kerosene are denominated 'Petroleum, refined' until 1871 and 'Oils, refined: illuminating' thereafter. The price series is consistent and corresponds with Brazilian imports of Kerosene. The Brazilian current wholesale prices are the arithmetic average of quarterly observations of imported goods in Rio de Janeiro. Due to missing observations, in several years the prices in Recife, Pernambuco were used. Although price quotations were not identical in both markets for obvious reasons of distance and supply, the differential is not so great in the given years to bias the series to a great degree. These prices are assumed to be in c.i.f. form, thus no adjustment for trade costs is necessary. All price series have been converted to British pounds sterling and indexed to 1913 to avoid problems of weight measurement conversion. *Sources*: Brazil, *Collecção*; Brazil, *Estatistica*; Brazil, *Annuario estatistíco*.

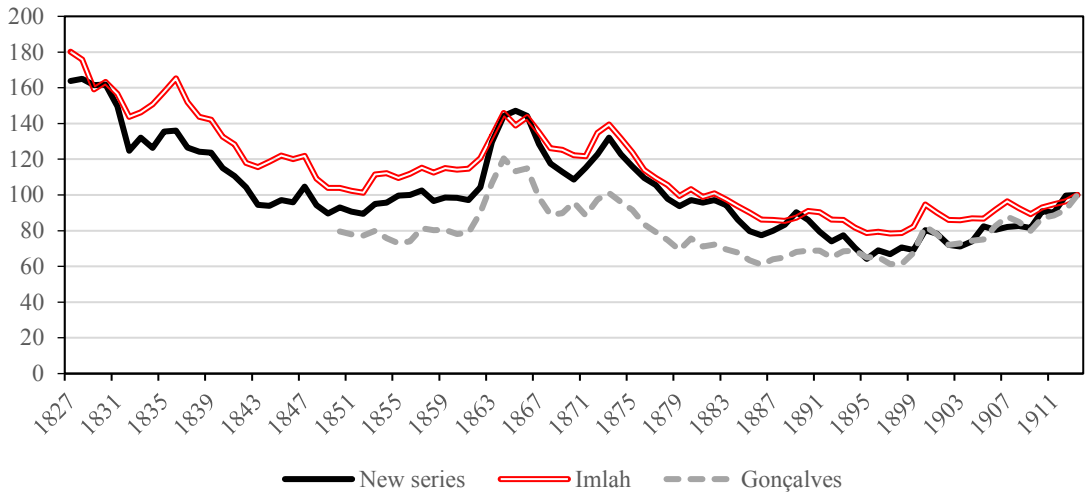

Figure 3.8. *Import price indices (1913=100), Brazil, 1827-1913*

Notes: Full series p. 301. *Sources*: New series: Great Britain: 1827-1852: United Kingdom, *Tables*. 1853-1913: United Kingdom, *Annual*. United States: 1827-1913: United States, *Commerce and Navigation*. Rio de Janeiro current market prices: *Anglo-Brazilian Times*, *Correio Mercantil*, *Diario de Pernambuco*, *Diario do Rio de Janeiro*, *Diario Mercantil*, *Semanario Mercantil*, *Jornal do Commercio*, *O Cruzeiro*, *O Despertador*, *Retrospecto Commercial* of the *Jornal do Commercio*, *Rio Commercial Journal*, and *Rio Mercantile Journal*. Imlah, *Economic Elements*; Gonçalves, 'Índices.'

Laspeyres indices, using each of the six benchmarks as reference years. We then take the geometric mean of these indices.

Figure 3.8 displays the new index, alongside the Gonçalves index of British imports, and Imlah's British export price index. The new series shows that import prices, weighted heavily by cotton manufactures in the early years, followed the general decline of British textile prices during the first half of the century, moderated slightly by the prices of foodstuffs. The second half of the century was dictated by fluctuations in the prices of raw materials (the most important of which being British coals) and foodstuffs. Inspection of the new index raises a number of interesting points. Firstly, by ignoring the weight of foodstuffs (particularly American wheat flour), the reliance on the Imlah index prior to 1860 exaggerates the price level. Secondly, the price shocks of the American Civil War in the 1860's and the rise of the price of British coals in the 1870s are accentuated in the new series due to the inclusion of American foodstuffs and the greater weight of coals in

the weighting system. Finally, the new series converges with the Gonçalves series towards the end of the period, indicating that the lower coverage of the later benchmarks does not affect the representativeness of the index to any great degree.

CONCLUDING REMARKS

This paper has aimed to shed new light on the accuracy of Brazil's foreign trade series. As shown here, for various reasons both the export and import series are under-valued. We have endeavoured to correct these series using a range of methodologies and examining the assumptions of these methodologies. With respect to the export series, we have corrected the official series by using international prices and official quantities to re-estimate the current value of the series. We have performed a robustness test on our corrected series, and it is evident that such tests do not alter the original results and their corresponding interpretation to any great degree. Regarding the import series, due to the lack of a time series of official import prices we have used the sum of available trading partner statistics plus the geographical distribution to re-estimate the official import series. A comparison with the sum of a sample of Brazil's principal trading partners shows that the official series was under-valued for much of the nineteenth century. We have shown that it was not the inclusion of transit trade in the trading partner statistics that was most likely the principal problem, but rather the reliance on under-valued official prices.

The reconstruction of Brazil's foreign trade series has numerous implications that future work might explore. To begin with, it would be instructive to re-evaluate the trade balance in light of the new series. Furthermore, the construction of the new export and import price indices allows for an examination of the development of Brazil's terms of trade over the century. This is an important issue given the importance of the Prebisch-Singer debate on the secular deterioration of the terms of trade and subsequent deindustrialisation for the literature on the development of the Latin American

economies.[190] Last, but not least, the recognition that official import prices were under-valued raises the question of the actual rate of nominal protection. Import tariffs were in most part specific and based on official price lists that, as we have seen, differed from market prices. The under-valuation of official prices would thus mean that reported tariff levels (in ad valorem terms) were over-valued. This leads one to question whether Brazil was one of the most heavily protected economies of Latin America,[191] or whether our understanding of this issue is clouded by the bias present in the official series.

[190] Williamson, *Trade and Poverty*.
[191] Coatsworth and Williamson, 'Always protectionist.'

Part 2

Revision

4

British slave emancipation and the demand for Brazilian sugar

Abstract. This paper studies the effect of British slave emancipation on the sugar industry in the northeast of Brazil. Combining pre-existing annual data on Brazilian exports and British, French, American and Hanseatic imports with a new monthly series of imports to Liverpool and New York, I argue that the British policies surrounding emancipation were related to a rapid increase in the demand for Brazilian sugar in the British market towards the end of mid-century. The results of an interrupted time series analysis show that the effect was particularly large following the end of apprenticeship in 1838 and the passage of the Sugar Act in 1846. I estimate that over the period 1827 to 1853, slave emancipation increased Brazil's market share by around five per cent, which corresponded to between 15 and 28 per cent of the volume of Brazilian exports. A comparison with markets unaffected by such policy interventions demonstrates that these trends were confined to the British market.

On the 1st of August 1834, the Slavery Abolition Act granted conditional freedom to 770,270 African slaves in the British colonies.[192] Apart from the West Indian colony of Antigua where slaves were awarded immediate freedom, the transition was carefully controlled by way of a period of 'apprenticeship,' whereby agricultural slaves over the age of six were bounded to the estates for a period of six years, those in non-agricultural professions for four. The period of apprenticeship was short-lived, however, prematurely cut short two years before the official deadline due to metropolitan abolitionist pressure.[193]

The economic effects of emancipation in the British colonies have been widely studied. Immediate post-apprenticeship effects included a decline in the volume of sugar exported from the British West Indies as a whole, a corresponding reduction of the share of the British West Indies in total British consumption, stagnant output from alternative British sources (principally Mauritius) due to labour shortages, a rapid increase in the price of sugar in the British market, and a decline in metropolitan consumption.[194] As Seymour Drescher observed, with the ending of apprenticeship '…the problem of sugar supply became one of Britain's major policy considerations.'[195] Metropolitan discontent over soaring prices generated political pressure to abolish the preferential sugar duties that maintained the British West Indies monopoly of supply to the British market. In the same session of Parliament as the passage of the Corn Laws, the Sugar Act of 1846 reduced the duty on foreign-grown sugar from 63 to 21 shillings per hundredweight.

[192] Deerr, *History, Vol. 2*, p. 306.
[193] Morgan, *Slavery*, pp. 194-198.
[194] Green, *British Slave Emancipation*, pp. 229-230; Drescher, *Mighty Experiment*, p. 158. The effect of emancipation on the sugar industry, however, differed across colonies. The immediate effect of emancipation on sugar output depended on the ratio of land to labour in each colony. Those colonies with higher land to labour ratios (Guiana, Jamaica) suffered the most during the transition as a large proportion of the labour force exited the plantation system. Engerman, 'Economic Change,' p. 134. For a critique of this argument, Monteith, 'Emancipation,'
[195] Drescher, *Mighty Experiment*, p. 159.

Despite protests from the colonies, the duties on foreign and colonial sugar were finally equalised in 1854.[196] The supply of 'foreign' sugar responded to the falling duties, prices dropped, West Indian merchant houses went bankrupt, and plantation values plummeted.[197]

The effects of the emancipation of slavery and subsequent policy interventions in the sugar market by the British government were not only felt by the colonies. The decline of the British West Indies had a flipside: the rise of 'foreign' sugar in the quantity retained for consumption in the British market. While the gains felt by third countries at the expense of the British colonies forms part of the narrative of British emancipation, non-colonial countries have largely taken a backseat in empirical and historical treatments of the subject. Meanwhile, the national historiographies of these countries, focused principally on supply-side conditions, have not established to any great degree the link between British slave emancipation and the expansion of the sugar industry. A recent empirical literature has explored the relation between British slave emancipation, the decline of the British West Indies and the growth of non-colonial sugar but has stopped short of establishing causality.[198]

This paper aims to bridge this divide by presenting a case study of the effect of British slave emancipation on a politically independent country: Brazil. Post-independence Brazil is an interesting case in that, unlike the Spanish West Indian colonies of Cuba and Puerto Rico, it represented a politically independent country. While sugar producers in northeastern Brazil maintained slave labour until emancipation in 1888, they

[196] Deerr, *History, Vol. 2*, pp. 437-441; Curtin, 'British Sugar Duties.'
[197] Green, *British Slave Emancipation*, pp. 234-236.
[198] Absell and Tuna-Junguito, 'Brazilian Export Growth;' Federico and Tena-Junguito, 'American Divergence.' Brief accounts of the effect of the decline of the British West Indies and the passage of the Sugar Act on Brazilian sugar exports are given in Barickman, *A Bahian Counterpoint*, p. 38; Klein and Luna, *Slavery*, pp. 79-80; Batista Jr., 'Política tarifária.'

could not tap into metropolitan financing to modernise their production processes nor benefit from preferential tariff schemes to protect their inefficient industries.

I argue that the policy events surrounding slave emancipation were linked to a rapid increase in the demand for Brazilian sugar towards the end of mid-century, which helped drive factor accumulation in terms of land and slave labour and the supply of unrefined cane sugar from the northeast of Brazil to historically unprecedented levels. The British demand for Brazilian sugar increased due to the rapid decline of West Indian supplies following the end of apprenticeship in 1838. Initially, Brazilian (together with Cuban and Puerto Rican) sugar filled the declining West Indian shares of the re-export market, as colonial preferences excluded non-colonial sugar from being retained for consumption, instead favouring British Indian and Mauritian supplies. The Sugar Act of 1846 reduced the tariff on non-colonial sugar, and, for the first time, 'foreign,' slave-grown sugar was awarded access to the British market. Imports of Brazilian sugar into the British market, and exports from the northeast, grew rapidly, and the United Kingdom soon became the principal consumer of Brazil's sugar.

This argument is supported by the quantitative analysis of pre-existing and new sources of data. I combine official British, American, French, Hanseatic, and Brazilian trade statistics with new series of monthly imports of sugar by origin to Liverpool and New York during the period 1827-1853. Using this data, I show that the series of policy interventions, beginning with *de jure* emancipation in 1834, are positively correlated with increased imports of Brazilian sugar in the short-run. The largest positive shock was that following the Sugar Act of 1846. However, trends following short-run shocks demonstrate a tendency to revert to the pre-intervention trend. I estimate that over the period 1827 to 1853, slave emancipation increased Brazil's market share by around five per cent. Given the relative size of the British market, however, this corresponded to

between 15 and 28 per cent of the volume of Brazilian exports, depending on the period. A comparison with markets unaffected by such policy interventions (the United States, Hamburg, and France) demonstrates that these trends were confined to the British market. In fact, trends in the American and Hanseatic markets were contrary to those of the British market, due to growing supplies of domestic cane, Cuban, and beet sugar.

The results of this paper speak to a diverse set of literatures and historiographies. To begin with, it contributes to the voluminous literature on the economic effects of British emancipation. I show that the effects of emancipation were not just confined to the sphere of the British Empire. Emancipation generated price signals that affected the relative demands for colonial and non-colonial sugar, and thus production decisions not only in Bridgetown, Demerara, and Montego Bay, but also in Recife, Salvador, Ponce, Havana and Matanzas. In the Brazilian case, it resulted in an export boom that would eventually attain historically unprecedented levels in terms of output volume and a rapid increase in the region's dependence on the British market as the leading consumer of its product.

Through the demand-side lens, the paper also provides a contrasting view to conventional supply-side histories of the Brazilian sugar industry. Scholars have made more of the sugar industry's decline during the second half of the nineteenth century than its revival in the post-independence decades.[199] A common theme that arises from the literature is that of competitiveness. Production techniques were backward, and the industry suffered from an inability to modernise in the face of stiff competition, initially from Cuba and later from beet sugar.[200] This paper shows that, despite being inefficient

[199] Eisenberg, *Sugar Industry*; Oliveira, *Crise*. A notable exception being Barickman, *A Bahian Counterpoint*, pp. 33-43.
[200] Prado Júnior, *História*, pp. 157-158; Furtado, *Formación*, pp. 118-119; Denslow, 'Sugar production;' Eisenberg, *Sugar Industry*.

when compared to other Caribbean producers, exports from the Brazilian northeast rapidly expanded during the mid-nineteenth century. This indicates that there were other factors, outside of relative productivities and the use of slave labour, which affected the competitiveness of Brazilian sugar in the international market. I argue here that, alongside the demand shock of British slave emancipation, market segmentation was important – for both northeastern Brazil and Cuba – and that segmentation was linked to each country's import trade and corresponding shipping network.

More generally, the paper contributes to the literature on the determinants of bilateral trade, particularly the strand that focuses on the externalities generated by shifts in trade policy.[201] One part of this strand highlights the positive effects of Empire on trade, mainly through trade preferences and customs unions.[202] The effect of Empire on countries lying outside of the colonial sphere, however, has received little treatment. By focusing on a politically independent peripheral exporter, I provide an outsider's perspective on the power of Empire. The paper also speaks to the literature on the redistributive effects of tariff reform. Perhaps the closest parallel to this study is the work on the Repeal of the British Corn Laws.[203] However, as Philip Curtain observed, '…while the repeal of the corn laws has gone down in history as a "good thing," the Sugar Act of 1846 has generally had a bad press.'[204] Such 'bad press' was, perhaps mistakenly, associated with the subsequent decline of the British West Indies. This paper complements the literature on the winners and losers of free trade by showing that while free labour regimes lost out to tariff reform, slave-grown sugar benefited enormously.

[201] For an overview, see Lampe and Sharp, 'Cliometric.'
[202] Mitchener and Weidenmeir, 'Trade;' Ayuso-Díaz and Tena-Junguito, 'Trade.'
[203] Williamson, 'Impact;' Federico, 'Corn laws.'
[204] Curtain, 'British Sugar Duties,' p. 157.

The structure of the paper is as follows. The next section reviews the literature on the export performance of the Brazilian sugar industry during the nineteenth century. Section three links this performance to British slave emancipation. Section four estimates the effect of the British policy interventions on imports of Brazilian sugar. Section five compares the British case to trends in other important markets. Section six provides an explanation for the failure of Brazilian sugar outside of the British market. Section seven concludes.

THE REVIVAL OF SUGAR IN THE BRAZILIAN NORTHEAST AND BRITISH SLAVE EMANCIPATION

The decades following political independence in 1822 were the most dynamic in terms of export growth for Brazil. Most of this growth was driven by the rapidly expanding coffee industry in Rio de Janeiro, which rose to dominate both Brazil's composition of exports and the world market during the 30 years following independence. However, the growth of coffee has diverted attention from another commodity boom: that of northeastern sugar. In fact, during the period 1821-1850 the quantum of sugar exports grew at 4.5 per cent per annum, a performance that was largely reversed during the final quarter of the century.[205]

The nineteenth century sugar boom was not the first in Brazil's history. Sugar was, in fact, the first major export commodity boom after Portuguese settlement in the sixteenth century. During the seventeenth century, the geographic centre of the international sugar market moved from the Atlantic islands of Madeira, the Canary

[205] 'Brazilian Export Growth.'

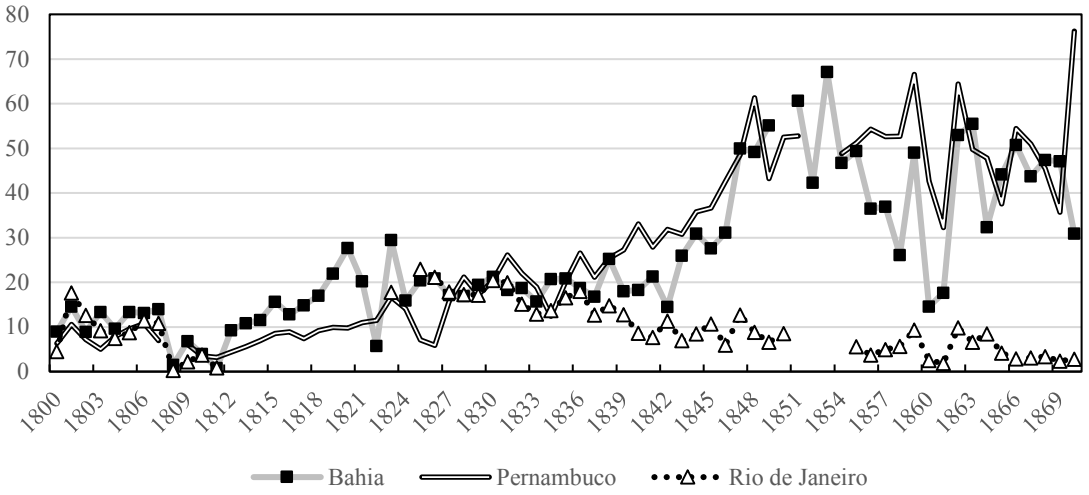

Figure 4.1. *Brazilian sugar exports, thousands of metric tons, 1800-1870*

Notes: Full series p. 312. Bahia figures for 1812-1849 are for total production, thus most likely higher than exports. *Sources*: Bahia, Pernambuco and Rio de Janeiro: 1800-11: Arruda, *Brasil*, pp. 359, 374, 417; 1855-57: Brazil, *Proposta ... 1859*, p. 206; 1858-61: Brazil, *Proposta ... 1862*, p. 211; 1862-63: Brazil, *Proposta ... 1866*, p. 205; 1864-65: Brazil, *Proposta ... 1868*, p. 149; 1866-70: Brazil, *Proposta ... 1870*, p. 164. Bahia: 1812-49: Soares, *Notas*, p. 228; 1850: average of 1849 and 1851; 1851-53: Bahia, *Falla ... 1855*, mappa 20; 1854: Bahia, *Falla ... 1856*, mappa 38. Pernambuco: 1812-30, 1840-50: Soares, *Notas*, pp. 254-255; 1831-39: United Kingdom, *Abstracts*, p. 606; 1851: Pernambuco, *Relatorio ... 1852*, p. 104; 1854: Pernambuco, *Relatorio ... 1857*, p. 73-74. Rio de Janeiro: 1823, 1825-26: Correa do Lago, *Escravidão*, p. 460; 1827-40: Maxwell, Wright and Co., *Commercial Formalities*, p. 90; 1841-45: MacGregor, *Commercial Statistics*, p. 172; 1846-50: Soares, *Notas*, p. 216.

Islands and São Tomé to the Portuguese colonies along the northeastern coast of Brazil.[206] By mid-century, these colonies were supplying the lion's share of the world supply of cane sugar to Europe. Exports rose from around two thousand metric tons in 1570 to 31 thousand in 1650.[207] Pernambuco was the leading producer during this period, most likely overtaken by Bahia towards the end of the seventeenth century. Thereafter, the rise of British and French West Indian production drove down the price of sugar and crowded out Brazilian product from some of the most important European markets.[208] Despite

[206] Galloway, *Sugar Cane*, pp. 48-50.
[207] Mauro, *Portugal*, pp. 256-257.
[208] Schwartz, *Sugar Plantations*, Chapter 7.

increased competition and falling prices, production remained roughly constant, and at the turn of the nineteenth century Brazil was producing around 20 thousand tons.[209]

In terms of sheer output volume, the nineteenth century boom was historically unprecedented for Brazil. By the mid-1820s, Bahia, Pernambuco and Rio de Janeiro together were producing and exporting around twice the estimate of the seventeenth century peak (Figure 4.1). Exports from these provinces gradually increased during the late-colonial period from the opening of ports to international trade in 1808 to independence in 1822. Exports then fluctuated around a constant trend until the early-1830s, when divergence occurred between the north- and southeastern sugar producing regions. In the southeast, sugar exports declined as coffee rose to dominate agricultural activity.[210] In Bahia and Pernambuco, the sugar industry rapidly expanded. In the space of 14 years, spanning the period 1834 to 1848, the volume of exports from Pernambuco more than tripled. Bahian exports rose from 14 thousand tons in 1841 to 60 thousand ten years later. The mid-century abolition of the Brazilian slave trade served to check this growth spurt, and output fluctuated wildly until the 1870s, when another boom drove output to a historical peak. Exports then declined as European beet sugar production pushed prices below production cost levels.[211]

This growth corresponded with the increasing concentration of exports to the British market. Sugar exports to Great Britain from Brazil's main sugar-producing regions grew in both absolute and relative terms during the period following emancipation and the Sugar Act, excepting Rio de Janeiro (Table 4.1). In the 15 years following

[209] Deerr, *History, Vol. 1*, pp. 112-113.
[210] Petrone, *Lavoura*; Marcondes, *Arte*; Dean, *Broadax*.
[211] Milet, *A Lavoura*; Góes, *Considerações*.

Table 4.1. *Volume (in hundredweights) and percentage share of Brazilian sugar exports to Great Britain*

	Pernambuco	Bahia	Paraiba	Alagoas	Rio de Janeiro
			Volume (cwt)		
1835	78,356	155,333	-	-	48,088
1841/42	146,946	126,546	20,087	24,489	9,300
1849/50	255,355	194,261	51,749	27,386	8,338
1872/73	953,545	857,191	195,883	255,353	1
			% of total sugar exports		
1835	11	21	-	-	15
1841/42	26	25	77	61	6
1849/50	30	18	100	51	6
1872/73	49	86	100	98	0

Sources: 1835: Pernambuco and Bahia: United Kingdom, *Tables ... 1835*, pp. 438-441; Rio de Janeiro: *Jornal do Commercio*. 1841/42, 1849/50: Brazil, *Collecção*. 1872/73: Brazil, *Estatistica*.

emancipation, the volume of exports from Pernambuco to Great Britain more than doubled, from 78 to 255 thousand hundredweights, and the British share in Pernambuco's total sugar exports almost tripled, from 11 to 30 per cent. During this same period, Pernambuco overtook Bahia to become the principal supplier of sugar to the British market. During the 1840s, exports to the British market also grew considerably in Bahia and two smaller sugar-producing regions, Paraíba and Alagoas. In the case of Paraíba, Great Britain had become the region's sole consumer by mid-century. In the period following the passage of the Sugar Act and tariff equalisation in 1854, exports boomed in all regions. By 1870, Great Britain came to occupy around half of Pernambuco's total exports, 86 per cent of Bahian exports, and virtually all the product shipped from Paraíba and Alagoas. Trends in the southeast of Brazil were considerably different. Sugar exports from Rio de Janeiro to the British market plummeted alongside the absolute contraction

of the industry. The marginal product that was exported after mid-century went mostly to regional markets in the Rio de la Plata.[212]

On the supply-side, the proximate cause of the growth trajectory outlined above was most likely rapid factor accumulation, specifically the expansion of land under cultivation and the large-scale importation of slave labour from Portuguese Africa. Technological progress before the 1870s was minimal, the result, as Peter Eisenberg observed for the case of Pernambuco, of 'cheap land, cheap labor, and "routinism…"'[213] Minor improvements in cane yield due to the adoption of Bourbon (Cayenne) cane, as well as the increased use of manuring, and the gradual introduction of horizontal presses probably contributed to increases in marginal output.[214] Growth during this period, however, was principally driven by the extension of cultivation and the continued importation of slave labour. Between 1818 and 1857, the number of sugar mills in Pernambuco more than doubled from around 500 to 1,106, and in Bahia from 315 to 800.[215] Although slave imports into Bahia and Pernambuco paled in comparison to the flow to the southeast, during the 28 years spanning independence to the abolition of the slave trade, Bahia and Pernambuco received 208 and 133 thousand slaves, respectively.[216] While the end of the slave trade in 1850 effectively stopped the import of African slaves, the northeast maintained a slave population of just over 480 thousand in 1872 (168 and 89 thousand in Bahia and Pernambuco, respectively) of a total 'colored' population of over three million.[217]

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[212] 'The rise of coffee.' Between the periods 1845-49 and 1869-73, sugar would also increase its share in Brazilian interprovincial trade. Marcondes, 'Mercado brasileiro,' p. 157.
[213] Eisenberg, *Sugar Industry*, p. 43. For a description of Bahian sugar production, Barickman, *Bahian Counterpoint*, pp. 169-177.
[214] Galloway, 'Sugar Industry,' pp. 295-296.
[215] Eisenberg, *Sugar Industry*, p. 124; Barickman, *Bahian Counterpoint*, p. 36.
[216] Eltis, *Economic Growth*, pp. 243-244.
[217] Klein, 'Internal Slave Trade,' p. 584; Klein and Luna, *Slavery*, pp. 85-86.

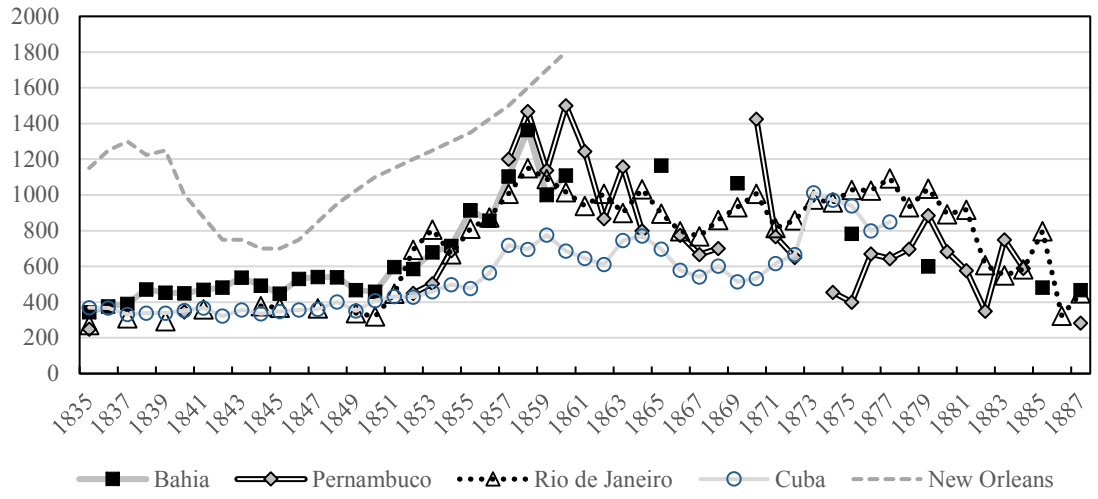

Figure 4.2. *Nominal slave prices, Brazil (mil-réis), Cuba (gold pesos), and the United States (dollars), 1835-1887.*

Notes: Full series p. 314. Bahia 1835-1860 is the average price of a healthy, skilled African slave. Bahia 1865-1887 is the five-year average price of a manumitted male adult slave. Pernambuco 1835-1850 is the decadal average price of adult slaves. Pernambuco 1852-1887 is the average price for males and females, 20-25 years old. Rio de Janeiro is the average price of male and female slaves, 17-49 years old. Cuba is the price of a male African, aged 15-40. New Orleans is the price of prime male field hands. *Sources*: Bahia: 1835-1860: Andrade, *Mão de Obra*, pp. 207-208; 1860-1887: Mattoso et al., 'Trend and Patterns,' p. 62. Pernambuco: 1835-1850: Resende et al., 'Preços,' p. 8; 1852-1887: Eisenburg, *Sugar Industry*, p. 153. Rio de Janeiro: Carvalho de Mello, *Economics of Labor*, p. 50. Cuba: Bergad et al., *Cuban Slave Market*, pp. 167-173. New Orleans: Evans, 'Economics,' p. 199.

Nominal slave prices in Bahia and Pernambuco mirrored these export trends (Figure 4.2). During the 1850s, nominal prices more than doubled, from 459 to 1,110 mil-réis per slave in Bahia and 450 to 1,500 in Pernambuco. Prices also followed similar trends in the Brazilian southeast, rising from 320 to 1,016 in Rio de Janeiro. [218] Prices fluctuated considerably thereafter, but the level remained above that of the pre-1850 period until the abolition of slavery in 1888. The timing of this rise corresponded with the definitive closure of the Brazilian slave trade in 1850. A comparison with slave markets outside of Brazil, however, indicates that the abolition of the trade was only partly responsible for these trends. Prices in Cuba and the United States also began a steady

[218] Prices in Minas Gerais, not included in figure 4.2 but available in the data appendix, also complemented this pattern. See Bergad, *Slavery*, pp. 272-273.

climb around mid-century. This roughly simultaneous price increase in the three major slave-holding economies of the Americas suggests that rising demand for slave-grown commodities was also an important determinant of the slave price trend in northeastern Brazil.[219]

The few demand-side explanations of northeastern Brazil's export performance present in the literature attribute this growth and corresponding demand for slave labour to the failure of other important producers, primarily the decline of the Haitian export economy following the Revolution and that of the British West Indies following slave emancipation.[220] This literature posits that the divergent economic performances observed following British emancipation had much to do with the characteristics of the labour regime. Indeed, the competitiveness awarded Brazilian planters from slavery and the slave trade became a defining aspect of Anglo-Brazilian relations from the opening of Brazilian ports in 1808 to the closure of the slave trade in 1850. Contemporary opinion and British policy suggested that slavery at once provided Brazilian sugar a competitive advantage over free-grown sugar and the British Government an excuse to exclude it from being retained for consumption in the domestic market.

British political propaganda circulated as early as 1808, shortly after the abolition of the British slave trade, argued that an independent Brazil would be 'ruinous to our Sugar Colonies and to the commercial interests dependent upon them,' given the continuance of the slave trade to Brazil coupled with its '…vast and fertile territory.'[221] Brazilian competitiveness not only affected the sugar-growing West Indian colonial interests, but also the network of shipping, exporting and financial interests that profited

[219] On this point see Bergad et al., *Cuban Slave Market*, p. 150; Bergad, *Comparative Histories*, pp. 157-162.
[220] Klein and Luna, *Slavery*, p. 78; 'Brazilian Export Growth;' Federico and Tena-Junguito, 'American Divergence.'
[221] Cited in Manchester, *British Preëminence*, p. 165-166.

from the sugar monopoly.[222] These views continued to be salient for abolitionists and representatives of the West India interest during the discussion of the sugar duties in the 1840s.[223] Alan Manchester saw no coincidence between the suppression of the Brazilian slave trade and the West Indies monopoly, observing that '…the period of severest measures directed against the slave trade of the empire coincided with the renewed activity of the reformers and the movement toward free trade.'[224]

Thus, the discussion in the literature of the impact of British slave emancipation and the passage of the Sugar Act on the Brazilian sugar industry has been overshadowed by Great Britain's aggressive role in the suppression of the Brazilian slave trade. Indeed, the issue of the sugar duties entered prominently into the discussion of the expiration in 1842 of the Anglo-Brazilian treaty of 1827, in which Great Britain obtained preferential access to the Brazilian market in exchange for the recognition of the country's independence.[225] The issue for Brazilian planters was not that of the state of the British colonies after emancipation, but the prohibitive duties that barred them access to the British market. The British attacks on Brazilian slavery and the slave trade were interpreted as affronts to Brazilian sovereignty, and the lack of reciprocity regarding Brazil's principal export commodities (coffee and sugar), justified by slavery, pure hypocrisy.[226]

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[222] *ibid*., p. 167.
[223] See discussion in Huzzey, 'Free trade,' pp. 369-373.
[224] Manchester, *British Preëminence*, p. 258.
[225] Bethell, *Abolition*, pp. 223-224.
[226] A column in the *Diario de Pernambuco* in 1842, on the subject of the renewal of the Anglo-Brazilian commercial treaty, observed that 'What is most horrifying in all this is that some Lords, and other individuals, that still today possess slaves, as shareholders in Congo-Soco Mining Company and others, where a thousand slaves are employed ... are also the bitterest opponents of the consumption of Brazilian sugar and coffee in Great Britain… but the monopolists are unashamed, and the English nation lives in slavery under the immense weight of the influence of this odious class…' The expiration of the treaty provided the perfect opportunity to check the 'pretensions' of the British and restore the 'dignity' of the Brazilian nation. *Diario de Pernambuco*, 1842 ed. 41, p. 3.

Nor were British parties interested in the Brazilian trade silent on this issue. As early as 1833, British merchants and shipowners in Liverpool involved in the Brazilian trade, calling themselves the 'Brazilian Association of Liverpool,' presented a petition to the House of Commons advocating for the admission of Brazilian muscovado sugar for the purposes of refining and exportation. Keenly aware of the political strength of the West Indian lobby, these merchants stopped short of suggesting tariff equalisation. Instead, they argued in favour of admitting foreign sugar for refining purposes to revive the British sugar-refining industry.[227] The Prussian consul, Johann Jacob Sturz, arguing 'On the expediency of allowing Brazil sugars to be refined in Great Britain for exportation' in 1837, observed that 'greater reciprocity' with Brazil would represent a boon for British interests at home and abroad. The admission of Brazilian sugar for refining would at once lead to the 'resuscitation of the sugar-refining trade,' increase 'the consumption of English manufacture in Brazil' as well as the import of British salt and coals, provide relief to British ships that 'return from Brazil with but one-third of a cargo,' and increase the export of British refined sugar 'to an almost incalculable extent.' Brazil was well positioned as a supplier due to 'The fertility of her soils … and the facility of exporting sugar as ballast for ships that load cotton, hides, coffee, and cocoa, from Rio de Janeiro, Bahia, Pernambuco, and Maranham…'[228] In 1841, after a period of high prices following the end of apprenticeship, the Association of Liverpool aired its grievances in the press. It pointed to 'The inadequacy of the supplies from the West Indies…', '…the present exorbitant price…' while, perhaps strategically, observing that '…a sufficient margin exists to admit of ample production to the West Indies; and … to bring this necessary article of domestic comfort within the means of the labouring classes.' In perhaps the most explicit critique of the government position, the statement concluded

[227] Such petitions were not only confined to Liverpool merchants. See Williams, *Capitalism*, pp. 154-168.
[228] Sturz, *Review*, pp. 120-132.

that 'The argument of the philanthropist, that by excluding the produce of slave-holding countries they promote the cause of abolition, is fallacious…' Brazil's slave-grown sugar would find other outlets in '…less scrupulous manufacturing nations… and slavery and slave labour would continue to flourish in defiance of all her attempts.'[229] Lobbying and political pressure from the Brazilian government were to no avail, however, and the eventual reduction and equalisation of the duties on sugar would be accomplished by the triumph of free traders in the British Parliament, rather than any external influence.

Ironically, at the height of Anglo-Brazilian tensions over the slave trade, the passage of the Sugar Act finally awarded slave-grown sugar access to the British market. The result was predicted by contemporary observers. In a pamphlet published three years after the passage of the Act, the barrister Stephen Cave wrote that 'Prices in England were much higher than those on the continent of Europe, hence the price of slave sugar has risen since the passing of the sugar bill, while that of free-grown sugar has fallen… it will be profitable for the slaveholder to extend his sugar cultivation … it is evident that the slave owner will undersell the free grower, and eventually supply our markets, as well as those on the continent…' Brazil, possessing '…a third of South America within her frontiers…' was in a prime position to expand production. What's more, Brazilian planters held no qualms about over-exploiting slave labour to meet British demand; citing reported atrocities by Brazilian planters, Cave ironically labelled them as 'the best of slave-masters.'[230] Reports from Brazil as part of a comprehensive report on the state of sugar growing in the British colonies and foreign countries confirmed these predictions. The British consul in Pernambuco reported that the harvest season of 1846/47 was '…one of unequalled prosperity. The removal of the differential duties on the import of sugar in

[229] Reproduced in the *Worcestershire Chronicle*, 5/5/1841, p. 4.
[230] Cave, *Few Words*, pp. 11-15, 21.

England, added to the fortunate contingency of an abundant harvest here, not only at once raised the export of sugar from 40,000 tons to 61,000 tons, but its average price from Rs. 1/600, or 3s. 7¼d., to Rs. 2/, or 4s. 6d. per arroba.' In Paraíba, the consul observed that 'Sugar cultivation is on the increase, and is likely to continue so as long as the market in England is open to Brazil as well as to other parts of the world.'[231] The largest sugar market in the world was now open for business, and Brazilian planters seized the opportunity.

BRITISH SLAVE EMANCIPATION, TARIFF REFORM, AND THE RISE OF 'FOREIGN' SUGAR

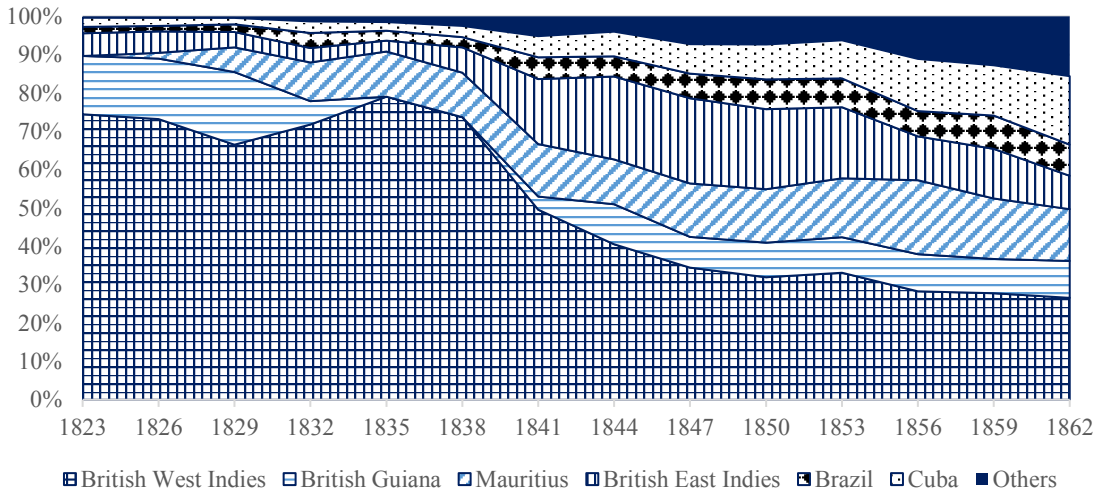
The immediate effect of slave emancipation in the British West Indies was a rapid decline in West Indian shares of the world market. However, these declines were relative and reflected the growth of the supply of non-British West Indian sugar to other important markets. In fact, between 1821 and *de facto* emancipation in 1838, British imports of West Indian colonial sugar stagnated around an average of just under four million hundredweights a year, while total imports of unrefined sugar increased from 4.2 to 5 million hundredweights. West Indian stagnation reflected the decline of some colonies (Grenada, Jamaica, Montserrat, St Lucia, St Vincent) and growth in others (Barbados, Trinidad, Demerara and Berbice (British Guiana)). The short-term impact of the end of apprenticeship and effective emancipation in 1838 on output was negative across the board. Between 1838 and mid-century, the quantum of British imports of unrefined sugar from the British West Indies contracted by an average of 52 per cent, while total imports increased by 22 per cent. Those most affected were Montserrat, Tortola, and Berbice (which suffered from rates of contraction of 187, 153 and 118 per cent, respectively),

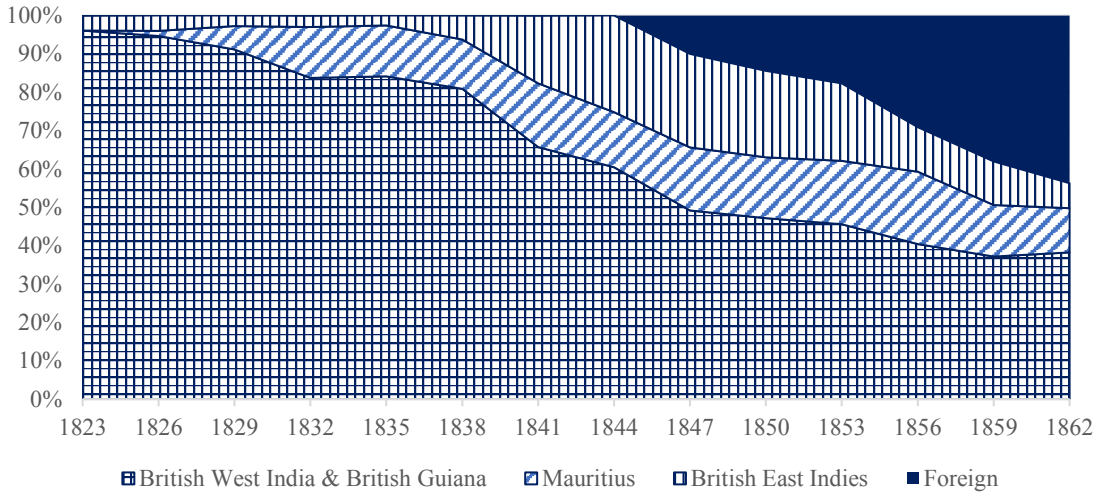
[231] United Kingdom, *Copies*, pp. 428-429, 452.

followed by Antigua, Grenada, Jamaica, Nevis, St Vincent, Tobago and Demerara, which contracted around the average. Certain colonies, (Barbados, Dominica and Trinidad) exhibited growth during the same period. These latter suppliers, however, only accounted for one-fifth of British imports over this period. As an aggregate, British imports from the West Indian colonies would never again reach the final peak of 4.1 million hundredweights achieved in 1831.

The decline of the West Indies monopoly of the supply of sugar to the British market heralded profound changes for the geographical distribution of British imports. Prior to the end of apprenticeship in 1838, the British West Indies supplied around three-quarters of the United Kingdom's total imports of unrefined cane sugar (Figure 4.3a). From 1838 onwards, the West Indies were replaced by British colonies in Asia (British India and the Straits Settlements), South America (British Guiana) and Africa (Mauritius), as well as non-colonial producers Cuba and Brazil. 'Foreign' sugar grew from occupying a share of five per cent in the early-1820s to over 40 per cent in the early-1860s. Of this share, Cuba and Puerto Rico filled around half, Brazil 30 per cent. Between 1838 and 1850, the Brazilian share of total imports more than doubled, from three to eight per cent, while the Cuban share tripled, from three to nine per cent. Brazil's share would reach its peak in the early-1870s at 13 per cent, shortly before the onset of the crisis wrought by beet sugar, and Brazil remained the second most important non-colonial supplier of unrefined cane sugar to the British market until the 1880s.

Shares of total imports disguise the fact that there effectively existed two different British markets for unrefined cane sugar: retained and re-exported. Figure 4.3b displays





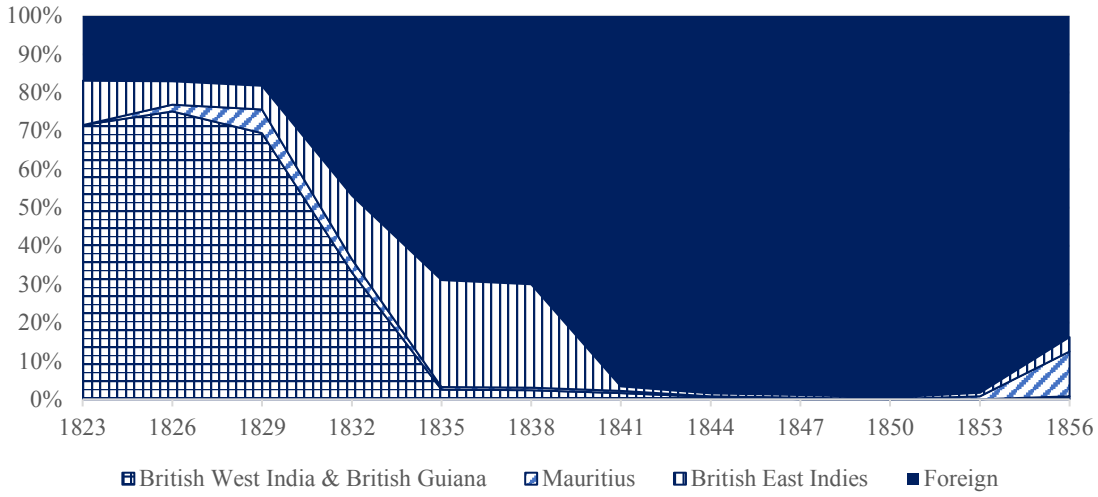


Figure 4.3. *The British market for unrefined cane sugar: a) shares (%) of total imports, b) shares (%) of retained for consumption, c) shares (%) of re-exports, three-year averages, 1823-1862*

Notes: Full series p. 316. Data for shares retained for consumption and re-exported do not disaggregate 'foreign' category. *Sources*: United Kingdom, *Tables*; United Kingdom**,** *Annual*; United Kingdom, *Sugar.*

the shares of colonial and non-colonial ('foreign') sugar retained for consumption. This includes sugar imported for the purposes of refining and resale on the European market, incentivised by a drawback scheme that exempted British refiners from import taxation. Between 1821 and mid-century, the volume of sugar retained for consumption doubled. In per capita terms, consumption rose from around 15 pounds in the early-1820s to 32 pounds in 1850. Most of this growth, however, occurred from the mid-1840s onwards. Prior to the tariff reform of 1846 discussed below, virtually no foreign sugar entered the British market for consumption. While the decline of the British West Indies share became apparent from the end of apprenticeship, this was initially replaced by sugar from Mauritius and British India. This had much to do with the gradual equalisation of the tariff on unrefined cane sugar across the British Empire, which initially favoured West Indian interests and reached its completion in May of 1840. From the mid-1840s onwards, the share of 'foreign' (Brazilian, Cuban, and Puerto Rican) sugar rapidly increased, rising from two per cent on the eve of the reform in 1845 to 20 per cent two years later, and reaching half of the share retained for consumption by the early-1860s.

Not only would non-colonial sugar come to occupy a sizable portion of the volume of unrefined sugar retained for consumption, but also virtually all the sugar sold by British merchants on the European re-export market (Figure 4.3c). Given the primacy of Great Britain's role in the distribution of tropical goods to Continental Europe (the carrying-trade), the re-export market was economically important. From 1820 to *de jure* emancipation in 1834, the re-export market constituted around a third of the size of the British market (retained for consumption) in terms of volume. One of the effects of emancipation and the decline of the West Indies was to shrink the relative and absolute size of this market, to nine per cent of retained imports from 1835 to mid-century, and to less than half the volume re-exported during the period 1821-34. Moreover, while the

British West Indies initially represented around 70 per cent of re-exports, during the six years from 1829 to 1835, West Indian product all but disappeared from the British re-export market. East Indian sugar would fill a portion of the shares lost by West Indian producers, although after 1838 much of this product was retained for consumption, and the re-export market became almost completely dominated by 'foreign' sugar.

Despite the complete abolition of slavery, the West Indian monopoly of the British market was maintained under a system of colonial preferences. Monopoly privileges were granted via a differential tariff scheme, which initially favoured West Indian interests, but later extended to Mauritius and the British East Indies. However, given the fiscal importance of the sugar duties for the United Kingdom, even the preferential tariff was high in effective terms. The duty on West Indian sugar peaked at 30 shillings per hundredweight in 1818, dropped to 24 in the period 1831-1840, increased to 25 in 1841-1844, dropped to 14 in 1845 and continued this decrease thereafter. In ad valorem terms, the tariff reached its peak in the period 1841-1844 at 94 per cent of the price. While the colonial duty represented a considerable tax on consumption, the tariff on foreign sugar was truly prohibitive. Until the Sugar Act of 1846, the duty on foreign sugar was at least double that of colonial produce.[232] Like the West Indian duty, the tariff on foreign sugar reached its peak in 1841-1844 at 66 shillings per hundredweight, an ad valorem equivalent of 223 per cent of the price of Cuban and Brazilian muscovado sugar. In August of 1846, this duty fell to 20, and gradually descended thereafter until equalisation with the colonial tariff of 11 in July 1854.

[232] In November of 1844, a tariff was introduced that differentiated slave-grown and non-slave grown sugar, the latter being admitted at just under 36 s/cwt. However, this system was abolished less than two years later, perhaps with the sad realisation that most of the 'foreign' sugar being imported was slave-grown.

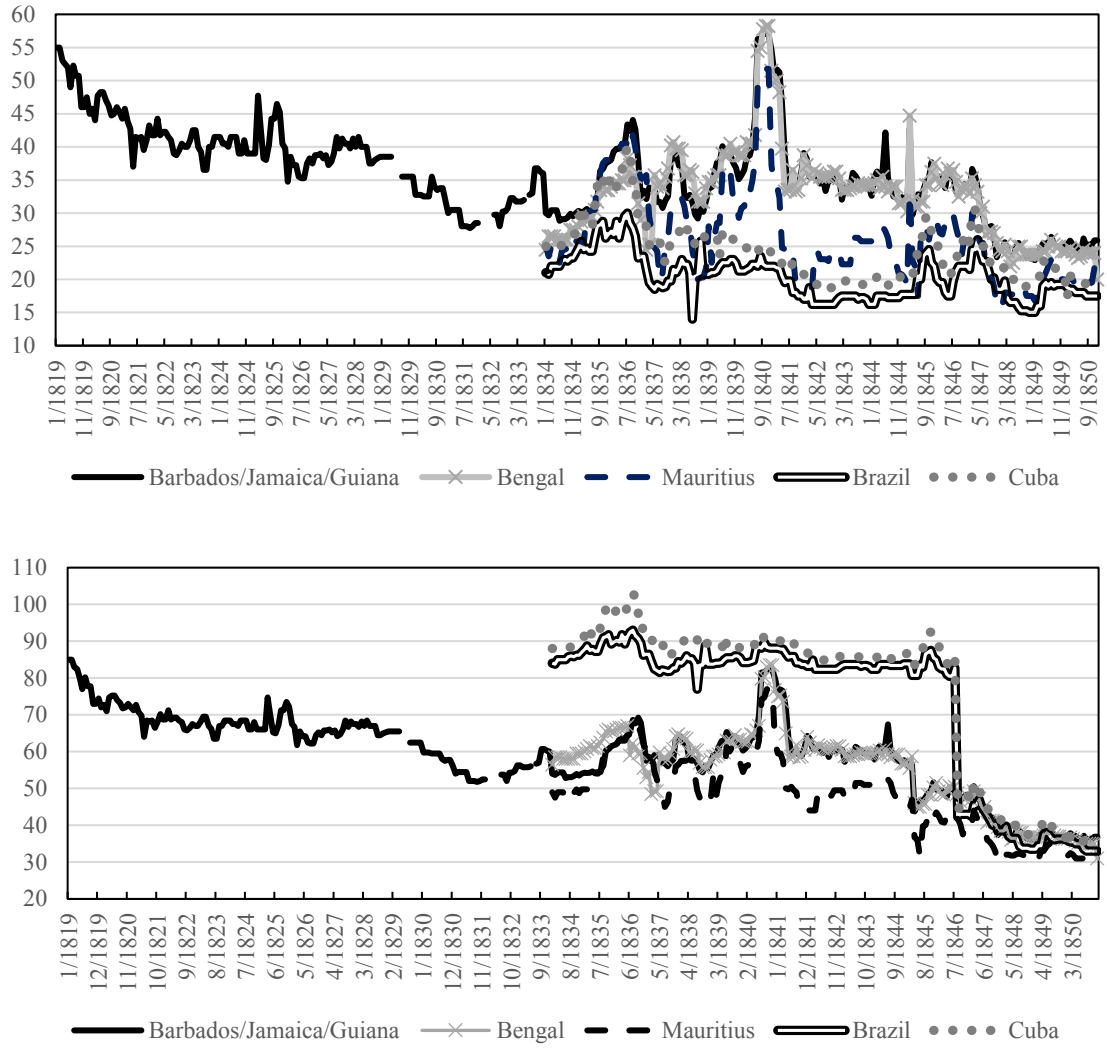


Figure 4.4. *Prices (s/cwt) of muscovado sugar in London: a) duty-free, b) duty-paid, monthly, 1/1819-12/1850*

Notes: Full series p. 318. The series Barbados/Jamaica/Guiana represents the simple average of the origins labelled 'Barbados,' 'Jamaica & C.,' and 'Demerara/Berbice.' Both Cuban and Brazilian series represent the prices quoted for 'brown and yellow,' while the others are labelled solely as 'brown.' *Sources*: Prices from *John Bull*; *Bell's Weekly Messenger*; specific duties from United Kingdom, *Sugar. An Account of*, p 3.

Tariffs affected the geographical distribution of import demand by artificially inflating the price of non-colonial product, effectively relegating it to the re-export market. The effect of the duties on prices is clearly discernible in Figure 4.4, which shows the prices of muscovado sugar in London for a sample of colonial and foreign countries, duty-free (Figure 4.4a) and duty-paid (Figure 4.4b). Duty-free, Brazilian muscovado sugar was cheaper than any other variety in the British market. Cuban sugar was also

cheaper than the colonial varieties by a considerable margin. The story changes radically when duties are added. Over the period 1/1834 to 7/1846, Brazilian and Cuban prices were on average 13 shillings cheaper than West Indian ones. Duty-paid, however, they were 27 shillings more expensive. This gap was temporarily reduced after *de facto* emancipation led to the doubling of colonial prices in just over two years. The reduction of foreign duties led to the rapid convergence of duty-paid prices in August of 1846, although Brazilian and Cuban varieties remained marginally more expensive than Mauritian sugar.

BRITISH POLICY INTERVENTIONS AND THE DEMAND FOR BRAZILIAN SUGAR

To test the effect of British slave emancipation and subsequent policies on the import of sugar from the Brazilian northeast, I exploit a new database of monthly sugar imports into Liverpool from 1827 to 1853. The data is taken from an underused source of trade data for the early-nineteenth century: British commercial newspapers. I rely on two sources. From January 1827 to March 1843, the data comes from the *Liverpool Mercury*, from March 1843 to December 1853, from *Gore's Liverpool General Advertiser*.[233] Source availability serves to delimit the periodisation of the study; there are gaps in the availability of the *Mercury* before 1827 and for the *General Advertiser* after 1853. However, this periodisation gives room for the estimation of the pre- and post-treatment effects of the policy interventions undertaken below (seven years prior to slave emancipation and seven years following the passage of the Sugar Act). The format of the listings of imports was identical for both sources. Imports were listed by region or country, ship and captain's name, origin port or region, quantity and description of the

[233] Both newspapers are available in digitised form through the British Newspaper Archive.

product discharged at the port, the name of the purchaser or whether the product was for re-sale or re-export ('for order'), and the name of the dock where the ship was moored. Once the data was collected and all quantities converted to metric tons, the series was tested for representativeness by comparing it to the national, annual aggregate series taken from the official sources. The trends of both the total series and geographical distribution of imports are close enough to those of the national trend to assume representativeness.[234]

The first step in ascertaining the connection between slave emancipation and Brazilian sugar is to identify a correlation between the timing of the British policy interventions, the growth of exports from the Brazilian northeast, and the growth of imports of Brazilian sugar to the British market. In this section, I proceed in two steps. First, I disaggregate the total sugar exported from Brazil and imported into the United Kingdom and Liverpool during the period 1822-50 into periods before, after, and between the interventions to ascertain whether the growth trends of Brazilian exports and British imports concord. Then, I run a single-group interrupted time series analysis of imports of Brazilian sugar on the monthly Liverpool series to determine the level and trend changes associated with each intervention. These estimates are used to calculate counterfactual market shares for Liverpool for the period 1827-53.

Table 4.2 displays the figures for sugar exports from Brazil and imports to the United Kingdom and Liverpool, in thousands of metric tons. I include the total figure over the period (1822-50), and the per annum figures for the period before (1822-33) and after the beginning of policy interventions (1834-50), and the period between interventions (1834-38, 1838-46, and 1846-50). The tendency of the volume of Brazilian

[234] See appendix 4.1 for more comprehensive discussion of series construction and representativeness.

Table 4.2. *Total and per annum exports (Brazil) and imports (United Kingdom, Liverpool) of cane sugar, thousands of metric tons, 1822-1850*

	Brazil			United Kingdom		Liverpool					
	Exports			Imports		Imports					
	Total	Pernambuco	Bahia	Total	Brazil	Total	Brazil	Pernambuco	Bahia	Paraíba	Alagoas
					Total						
1822-50	2,222	774	722	7,320	321	1,080	115	56	38	10	7
					Per annum						
1822-50	82	29	27	271	12	40	4	2	1	0.4	0.3
1822-33	55	16	18	223	6	21	1	0.5	0.5	0.1	0.04
1834-50	92	34	30	273	15	49	6	3	2	0.5	0.4
1834-38	76	21	20	237	5	45	3	1	1	0.4	0.05
1838-46	88	32	24	253	13	43	5	3	2	0.3	0.3
1846-50	116	50	49	345	26	64	9	5	3	0.8	0.8

Notes: The Liverpool series begins in January 1827. Bahian export figure represents total production. United Kingdom and Liverpool imports include re-exports.
Sources: Brazil: IBGE, *Estatísticas*; Pernambuco and Bahia: same as Figure 4.1. United Kingdom: *Tables*. Liverpool: *Liverpool Mercury*; *Gore's Liverpool General Advertiser.*

exports and British imports over time largely concord: in per annum terms, more sugar was exported from Brazil and imported into the United Kingdom during the period following slave emancipation. The figures for Liverpool for the period 1827-50 are particularly striking: imports from Brazil increased from an average of 1,000 metric tons per annum before 1834 to 6,000 tons during the post-emancipation period to mid-century. Per annum export figures for Pernambuco doubled over this period, while Bahia experienced a lesser but still notable increase. In the Liverpool market, Pernambuco was the leading supplier in terms of total volume, followed by Bahia, Paraíba, and Alagoas. Marginal amounts were also imported from Ceará, Maranhão, Pará and Rio de Janeiro during the period following emancipation. While each of the interventions was associated with increases in both exports and imports of Brazilian sugar, it was the passage of the Sugar Act that seemingly had the strongest effect. In just five years following the passage of the Act in 1846, both Pernambuco and Bahia exported over 200 thousand metric tons of sugar each, around 30 per cent of the 1822-50 total. On the import side, this figure was 40 per cent, and in the case of imports from Alagoas in Liverpool, over half the volume imported during these thirty years arrived between 1846 and 1850.

To determine the level and trend changes associated with each intervention and to ascertain whether they were significantly different from the pre-treatment trend, I run an interrupted time series analysis on the monthly series of Brazilian imports to Liverpool. Interrupted time series analysis is a common time series approach to evaluating the impact of an intervention on a single unit, provided that multiple observations of the outcome variable of interest are available for both the pre- and post-treatment periods.[235] The Liverpool series is of a sufficiently high frequency (monthly) and duration (26 years) to

[235] Linden, 'Conducting;' 'Comprehensive.'

provide ideal fodder for such an analysis. To exploit the full series and calculate counterfactual estimates of market shares, in this section I undertake a single-group (without a control) interrupted time series analysis. The inclusion of control groups and the important issue of unobserved confounding are taken up in the next section.

The single-group interrupted time series analysis takes the following form:

$$Y_t = \gamma_0 + \beta_1 T_{pre} + \overbrace{\gamma_1 X_{1834} + \beta_2 XT_{1834}}^{slave\ abolition} + \overbrace{\gamma_2 X_{1838} + \beta_3 XT_{1838}}^{apprenticeship} + \overbrace{\gamma_3 X_{1846} + \beta_4 XT_{1846}}^{sugar\ act} + \overbrace{\gamma_4 X_{1850} + \beta_4 XT_{1850}}^{brazilian\ slave\ trade} + \gamma_5 D_{1831} + \varepsilon_t, \text{ [1]}$$

where Y_t is import volume (in metric tons) at month t, γ_0 is the initial intercept, T_{pre} is the pre-treatment slope, $X_{1834,\ldots,1850}$ are dummies that capture the level change following the immediate introduction of the treatment, $XT_{1838,\ldots,1850}$ is the difference between the pre- and post-treatment slope. Intervention points are included for the effective date of abolition (8/1834), the end of apprenticeship (8/1838), the effective date of the Sugar Act (8/1846), as well as the definitive abolition of the Brazilian slave trade (9/1850). In 1831, imports of Brazilian product to the United Kingdom increased temporarily to abnormal levels, perhaps in anticipation of the legislated abolition of the Brazilian slave trade. I interpret this increase as an outlier and include the dummy D_{1831} to control for its effect on the pre-treatment trend.[236] To avoid biased estimates derived from the seasonal nature of the monthly data, I seasonally adjust the data by regressing the series on a constant and set of monthly dummies and then adding the residuals to the original mean.[237] The frequency of the data also generates problems of serial correlation. Post-estimation

[236] The dummy is not statistically significant for other suppliers to the British market, indicating that the increase was only associated with the Brazilian trade.
[237] Baum, *Introduction*, pp. 174-178.

(Cumby-Huizinga) tests indicated significant serial correlation at the 12-month lag, so the maximum lag is dropped to 10 months.[238]

The exact timing of the supply response to increased demand for Brazilian sugar is difficult to pinpoint. The pace of the response might have ranged from quick (if sugar produced using pre-existing resources was diverted from other destinations to the British market**)** to slow (if the response included investment in milling infrastructure and the expansion of the agricultural frontier). Furthermore, time spent in transit from plantation to port, and from port to destination across the Atlantic served to further lag the response time that will be detected in the Liverpool data. To ascertain the nature of the short- and long-run responses of Brazilian imports to the British policy interventions, I take the average of the coefficients of the pre- and post-trend from 12-month iterations following each treatment.[239] These are presented, along with the averages of the coefficients of the constant and treatment intercepts, in Table 4.3. Column 1 displays the results with the dummy for the 1831 outlier. Imports increased from an initial level of 183 metric tons at a rate of 0.3 metric tons per month. While the 'immediate' effects (treatment intercepts) of the policy events of 1834, 1838 and 1846 were positive, only the end of apprenticeship and the effective date of the Sugar Act were statistically significant. The post-trend following the effective date of the Slave Abolition Bill was slightly above the pre-trend, although the pre-post trend difference was not statistically significant. The post-trends following the events of 1838 and 1846, on the other hand, were negative. The adverse is true for the negative shock of the abolition of the Brazilian slave trade, which displays a large, positive and statistically significant post-treatment trend. Together, these results indicate large level changes followed by slow reversions to the pre-trend.

[238] The estimation is performed in STATA using the user-written itsa and actest commands.
[239] In itsa, the post-trend is calculated as the sum of the pre-trend T and pre-post trend difference XT for each intervention.

Table 4.3 *Results of single-group interrupted time series analysis of imports of Brazilian cane sugar, average coefficients (metric tons per month) of 12-month iterations from intervention point*

	1	2	3	4	5	6
	Dummy	No dummy	1834	1838	1846	1850
Constant	183.2 (6.8)***	199.7 (4.4)***	183.2 (6.9)***	156.7 (7.3)***	133.5 (4.7)***	74.3 (1.7)*
Pre-trend	0.3 (0.5)	1.3 (1.5)	0.3 (0.5)	1.2 (3.7)***	1.8 (5.6)***	2.5 (5.9)***
			Intercepts:			
1834	86.1 (1.1)	-30.5 (-0.3)	61.9 (0.8)	-	-	-
1838	209.4 (2.3)**	209.4 (2.3)**	-	111.1 (1.2)	-	-
1846	667.4 (4.4)***	667.4 (4.4)***	-	-	329.7 (1.9)**	-
1850	-227.4 (-1.2)	-227.4 (-1.2)	-	-	-	-449.3 (-2.4)**
			Post-trend:			
1834	0.8 (0.3)	0.8 (0.2)	2.8 (4.1)***	-	-	-
1838	-0.7 (-0.8)	-0.7 (-0.8)	-	2.6 (2.4)**	-	-
1846	-11.6 (-2.7)***	-11.6 (-2.7)***	-	-	-1.1 (-0.3)	-
1850	29.6 (3.9)***	29.6 (3.9)***	-	-	-	29.6 (3.9)***
C-H chi^2 (p-value)	1.1 (0.3)	0.7 (0.4)	0.0 (0.9)	0.0 (0.9)	0.1 (0.7)	0.1 (0.7)
Obs.				324		

Notes: This table displays the results of a single-group interrupted time series analysis estimated with OLS, with Newey-West standard errors and a 10-month lag structure. T-values in parenthesis. C-H chi^2 represents the Cumby-Huizinga chi-squared statistic, which is statistically significant in the presence of autocorrelation. *Sources*: *Liverpool Mercury*; *Gore's Liverpool General Advertiser*.

Column 2 shows the results without the dummy for the 1831 outlier. As expected, both the constant and pre-trend are larger, demonstrating that the ephemeral and exaggerated increase in 1831 was abnormally above trend and served to inflate the size of the pre-trend coefficient. Columns 3 to 6 estimate the effect of each intervention separately. The gradual increase of the pre-trend coefficient from 0.3 to 2.5 captures the positive effect of the omitted treatments. As the effect of these omissions serves to inflate the pre-trend, the size and statistical significance of the treatment intercepts and post-trends are affected.

This is clear evidence of omitted variable bias and lends weight to the results of the specification displayed in column 1.

Using the iterated monthly pre-trend estimates from [1], I calculate the counterfactual volume of Brazilian imports to Liverpool in the absence of the policy interventions as

$$Y_t^* = \frac{1}{n}\sum_{i=1}^{n}(\widehat{\gamma_{0,i}} + \widehat{\beta_{1,i}}) * t, \text{ [2]}$$

that is, the average of the sum of the coefficients of the constant (γ_0) and pre-trend (β_1) predicted in each of the 12 iterations *i* of [1], multiplied by period *t*, with 1/1827 taken as month 0. To present the counterfactual volume in terms of the share of total imports to Liverpool, I estimate the constant and pre-treatment trends of the British West Indies, British India, British East Indies, non-colonial suppliers (the rest), and total imports with [1], then construct each time series separately with [2]. The share is calculated as the counterfactual volume of each supplier (or supplying region) over the counterfactual total volume. These shares are compared with actual shares in Table 4.4. The differences between actual and counterfactual shares provide a ball-park estimate of the impact of the policy interventions examined here. Of course, the counterfactual estimates assume the maintenance of the status quo as it was prior to British slave emancipation. Perhaps unsurprisingly, status quo implied lower shares of Brazilian and non-colonial (predominantly Spanish West Indies) imports. It also implied slightly higher shares for the British West Indies, and the substitution of British India for the Empire's rising star of the East Indies, Mauritius. The case of the latter is particularly extreme and shows how

Table 4.4. *Actual and counterfactual average shares (%) of sugar imports in Liverpool, 1827-1853*

	British West Indies	British India	British East Indies	Brazil	Other non-colonial
			Actual		
1827-53	57	18	8	11	7
1827-33	83	4	5	6	2
1834-38	73	8	9	6	3
1838-46	44	26	11	13	7
1846-53	34	29	7	15	14
			Counterfactual		
1827-53	67	6	16	6	6
1827-33	83	4	5	6	2
1834-38	68	6	15	6	6
1838-46	63	6	19	6	7
1846-53	57	6	24	6	8
			Difference (Actual-Counterfactual)		
1827-53	-10	12	-8	5	1
1827-33	0	0	0	0	0
1834-38	6	2	-6	0	-3
1838-46	-19	20	-8	7	0
1846-53	-23	23	-17	10	7

Sources: As per Table 4.3.

the process of slave emancipation retarded the growth trajectory of the British Empire's most price competitive sugar colony. The counterfactual estimates also show that the British West Indies' decline in the total share of imports would have occurred even in the absence of slave emancipation.

In the case of Brazil, I estimate that the policies surrounding British slave emancipation contributed to an increase of five per cent of Brazil's market share in Liverpool over the period 1827-53. Market share gains were especially important following the end of apprenticeship and the effective date of the Sugar Act. In terms of Brazilian exports, this accorded with 15 per cent of the total volume exported during the period 1827-53, 20 per cent of that exported in 1838-46, and 28 per cent of that exported

following the Sugar Act to 1853. For Pernambuco and Bahia, five percent of the British market share translates into 46 and 45 per cent of the volume exported for the period 1827-53, respectively. Such market share gains no doubt provided a fillip to Brazilian sugar export growth and the expansion of the agricultural frontier.[240]

THE COMPARATIVE EFFECT OF BRITISH POLICY INTERVENTIONS

While the results of the single-group analysis indicate a positive relationship between the British policies and the demand for Brazilian sugar, it is possible that these results confound the effect of British slave emancipation with general trends in the international market for sugar. To control for possible unobserved confounders, here I present the results of a controlled interrupted time series (CITS) analysis using two sets of control groups. Firstly, to match the Liverpool data, I construct a control group that consists of monthly observations of sugar imports by origin to the port of New York for the period 1/1827 to 12/1848. Then, using this control, I run a controlled version of [1]. Secondly, I repeat this exercise on annual data with an expanded control group, including the United States, Hamburg, and France that, despite starting in 1831, serves as a further robustness test of whether the observed effects of the policies were solely confined to the British market. [241]

Besides data availability, New York (and the Unites States generally) is an interesting point of comparison for several reasons. Firstly, unlike the British (and

[240] It must be kept in mind, however, that these counterfactual estimates are sensitive to the size of the pre-trend coefficient; the use of the coefficient without the dummy (shown in Col. 2 of Table 4.3) reduces Brazil's 1827/53 market share gain to one per cent.

[241] The deficiencies of trade statistics for the first half of the nineteenth century are well known. A representative cross-section of sugar imports by country is unavailable for the period under study. Those official records that do exist either start later (Hamburg (1831), Belgium (1834), Portugal (1837), Spain (1849)), do not disaggregate total sugar imports by country (France until 1831), or are for countries characterised by colonial preferences and, in the French case, a roughly contemporaneous slave emancipation shock (in 1848). Perhaps the single exception is the American sources (beginning in 1821), although, like all official trade records, these are annual compilations, which severely restricts the window of time series observations. On the quality and availability of data for this period, see Federico and Tena-Junguito, 'World Trade,' pp. 13-20.

French) case, the American market for foreign cane sugar remained undistorted by monopolistic forms of competition during the first half of the nineteenth century. While the domestic production of cane sugar no doubt served to reduce demand for foreign sugar, especially in the South, all sources of foreign imports, without exception, were subjected to a specific duty of three cents per pound, reduced to two and a half cents in 1832, and 30 per cent ad valorem in 1847.[242] Moreover, New York was the principal North American port for the sugar trade, accounting for around 70 per cent of national imports during the period 1827 to 1848.[243] The data for the monthly New York series of sugar imports come from the *Shipping and Commercial List and New York Price Current*, which published convenient monthly statements of imports into the port of New York by port of origin. Unfortunately, these statements were no longer published after 1849, which restricts the temporal extension of the monthly CITS. It does, however, provide an adequate window to compare the effects of the British policies, albeit only the short-term effects of the passage of the Sugar Act.

The multiple group analysis takes the following form:

$$Y_t = \gamma_0 + \beta_1 T_{pre} + \gamma_1 Z_{pre} + \beta_2 ZT_{pre} + \overbrace{\gamma_2 X_{1834} + \beta_3 XT_{1834} + \gamma_3 ZX_{1834} + \beta_4 ZXT_{1834}}^{slave\ abolition} + \overbrace{\gamma_4 X_{1838} + \beta_5 XT_{1838} + \gamma_5 ZX_{1838} + \beta_6 ZXT_{1838}}^{apprenticeship} + \overbrace{\gamma_6 X_{1846} + \beta_7 XT_{1846} + \gamma_7 ZX_{1846} + \beta_8 ZXT_{1846}}^{sugar\ act} + \gamma_8 D_{1831} + \varepsilon_t \quad [3],$$

where Y_t, γ_0, T_{pre}, $X_{1834,\ldots,1846}$, $XT_{1838,\ldots,1846}$ and D_{1831} are the same as [1], Z_{pre} is the difference between the intercepts of the control and treated group prior to treatment, ZT_{pre}

[242] In terms of Brazilian sugar prices in New York, the specific duty represented an average ad valorem equivalent of 39 per cent from 1827 to 1846.
[243] Calculated as the share of the total New York series in total imports of unrefined cane sugar, from United States, *Commerce and Navigation*.

is the difference between control and treated pre-treatment trends, $ZX_{1834,\ldots,1846}$ the difference in level change between control and treated following the immediate introduction of the treatment, and $ZXT_{1834,\ldots,1846}$ the difference between control and treated of the difference in the pre-post trend. Given that the New York series ends in 12/1848, here I am unable to assess the comparative impact of the abolition of the Brazilian slave trade. Again, I include a dummy for Brazil in Liverpool for the 1831 outlier, Y_t is seasonally adjusted, and the maximum lag is increased to 18 months due to the detection of serial correlation.

The results in Table 4.5 demonstrate that the trends in the Liverpool market surrounding the policy interventions were not driven by unobserved confounders and were largely confined to the British market. Columns 1 and 2 show the individual coefficients for New York and Liverpool, respectively, and column 3 the coefficients of Z_{pre} (constant), ZT_{pre} (pre-trend), $ZX_{1834,\ldots,1846}$ (intercepts), and $ZXT_{1834,\ldots,1846}$ (diff-in-diff of slopes). The coefficients of the post-trend are calculated as in Table 4.3. The coefficients on the differences of the constant and pre-trend in column 3 are statistically insignificant, which indicates that New York is a suitable control group for separating the effect of the interventions from the influence of shared, unobserved factors. Apart from the effective date of the Slave Abolition Bill in 1834, the differences of the intercepts are large and, in the case of the effective date of the Sugar Act in 1846, statistically significant. Excepting the end of apprenticeship, there is considerable divergence in the post-trend between New York and Liverpool, demonstrating that the trends following the interventions were largely confined to the British market. This is highlighted by the statistically significant differences in the difference of pre-post trends (the 'diff-in-diff in

Table 4.5. *Results of controlled interrupted time series analysis of imports of Brazilian cane sugar, average coefficients (metric tons per month) of 12-month iterations from intervention point*

	Dummy			No dummy
	1	2	3	4
	New York	Liverpool	Diff	Diff
Constant	71.7 (3.2)***	61.9 (2.6)***	-9.8 (-0.3)	10.0 (0.2)
Pre-trend	1.3 (1.9)**	0.6 (1.2)	-0.7 (-0.8)	0.5 (0.2)
		Intercepts:		
1834	109.6 (1.1)	103.7 (2.0)**	-5.9 (-0.1)	-144.4 (-1.0)
1838	121.3 (1.8)*	199.6 (2.5)**	78.3 (0.8)	78.3 (0.8)
1846	11.2 (0.4)	622.1 (3.0)***	610.9 (2.9)***	610.9 (2.6)***
		Post-trend:		
1834	-5.5 (-2.0)**	1.9 (1.3)	-7.5 (2.3)**	7.5 (2.3)**
1838	-1.6 (-2.8)***	-0.8 (-1.1)	0.8 (0.1)	0.8 (0.2)
1846	3.0 (2.4)**	-4.3 (-0.1)	-7.4 (-0.3)	-7.4 (-0.3)
		Diff-in-diff (slopes)		
1834			8.2 (2.4)**	6.9 (1.9)**
1838			-6.7 (-1.7)*	-6.7 (-1.7)*
1846			-8.1 (-0.3)	-8.1 (-0.3)
C-H chi^2 (p-value)		1.4 (0.3)		1.6 (0.2)
	Obs			528

Notes: This table displays the results of a controlled interrupted time series analysis estimated with OLS, with Newey-West standard errors and an 18-month lag structure. T-values in parenthesis. C-H chi^2 represents the Cumby-Huizinga chi-squared statistic, which is statistically significant in the presence of autocorrelation. Figures in diff columns may not be the exact sum of New York and Liverpool due to averaging. *Sources*: Liverpool: as per Table 4.3. New York: *Shipping and Commercial List and New York Price Current.*

slopes'), which indicates that the pattern of large level changes followed by gradual reversion to the pre-treatment trend discussed in the previous section was not a shared characteristic of both markets. Column 4 shows the difference coefficients without the dummy for the 1831 outlying period. As in the single-group analysis shown in Table 4.3,

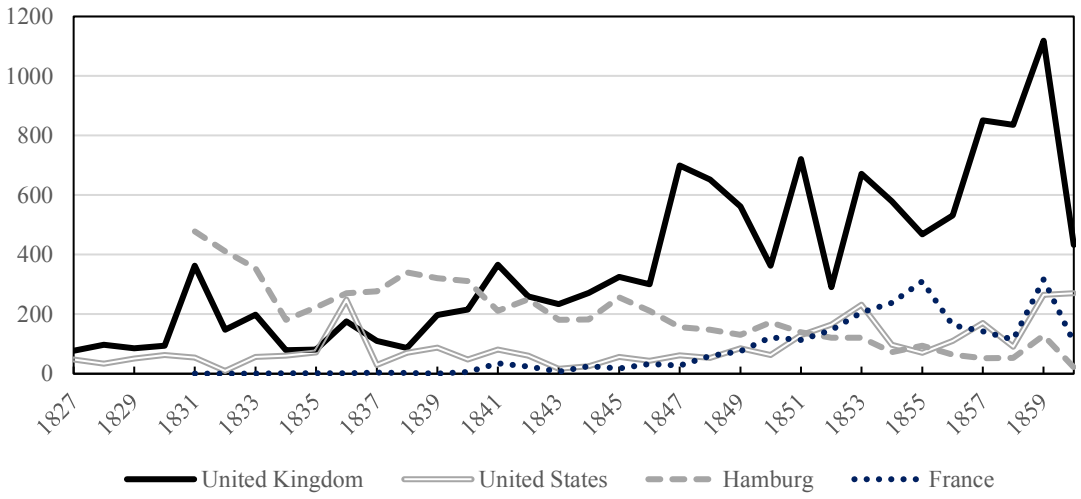


Figure 4.5. *Imports (thousand hundredweights) of Brazilian sugar, 1827-1860*

Notes: Full series p. 352. *Sources*: United Kingdom, *Tables*; United Kingdom, *Annual*; United States, *Commerce and Navigation*; Hamburg, *Tabellarische*; France, *Tableau*.

removing the dummy alters the pre-treatment trend and intercept, which serves to distort the results of the first intervention point.

A further source of potential confounding might lie in the possibility that the trends in Great Britain merely reflected what was taking place in Continental European markets, and that the United States was an outlier. To explore this possibility, I add two other destinations to the control group: Hamburg and France. Together, these four destinations accounted for around half of Brazilian exports of sugar in 1841/42.[244] Annual data for imports of sugar by origin are available for these destinations from 1831, so I add these to the annual series for the United Kingdom and United States and extend the post-treatment time frame to 1860. Visual inspection of the series (Figure 4.5) lends weight to the argument that these effects were confined to the British market. The British series trends upwards from 1838 onwards, while imports in the other markets either declined

[244] Brazil, *Collecção*. Sugar imports for Brazil's other two important trading partners, the Austrian Empire and Portugal, are unavailable for the period.

Table 4.6. *Results of controlled interrupted time series analysis of imports of Brazilian cane sugar, thousands of metric tons, annual observations, 1827-1860*

	Treated:	Control:							
	United Kingdom	All		United States		Hamburg		France	
	Single	Single	Diff	Single	Diff	Single	Diff	Single	Diff
Constant	64.5 (7.5)***	139.6 (1.5)	-75.1 (-0.8)	47.2 (11.8)***	17.3 (1.5)	476.4 (519.5)***	-411.9 (-37.1)***	0.6 (4.6)***	63.9 (5.8)***
Pre-trend	18.4 (6.6)***	-9.4 (-1.0)	27.9 (2.8)***	-0.7 (-0.5)	19.2 (5.0)***	-61.9 (-81.1)***	80.3 (21.8)***	-0.1 (-1.1)	18.5 (5.2)***
				Post-trend:					
1834	18.8 (3.6)***	14.3 (0.7)	4.5 (0.2)	8.3 (0.4)	10.5 (0.5)	33.7 (11.2)***	-14.9 (-2.0)**	0.9 (5.2)***	17.9 (2.6)***
1838	23.7 (3.8)***	-7.7 (-0.6)	31.4 (2.0)**	-6.3 (-3.7)***	30.0 (3.7)***	-19.4 (-3.3)***	43.1 (4.3)***	2.6 (2.4)**	21.1 (2.6)***
1846	73.6 (2.3)**	0.9 (0.01)	72.8 (2.1)**	11.5 (7.8)***	62.1 (1.5)	-25.2 (-7.9)***	98.8 (2.4)***	16.2 (8.2)***	57.4 (1.4)
1850	35.4 (3.2)***	1.6 (0.3)	33.8 (2.7)***	11.3 (2.0)**	24.1 (1.7)*	-10.4 (-4.4)***	45.8 (3.4)***	3.9 (0.7)	31.5 (2.2)**
C-H chi^2 (p-value)		2.1 (0.2)		1.6 (0.2)		1.4 (0.3)		1.7 (0.2)	
Obs		128		68		64		64	

Notes: This table displays the results of a controlled interrupted time series analysis estimated with OLS, with Newey-West standard errors and a 7-year (All) and 5-year (United States, Hamburg and France) lag structure. T-values in parenthesis. C-H chi2 represents the Cumby-Huizinga chi-squared statistic, which is statistically significant in the presence of autocorrelation. Figures in diff columns may not be the exact sum of the United Kingdom and control due to averaging. The Hamburg and France series begin in 1831. *Sources*: As per Figure 4.5.

(Hamburg), stagnated (the United States) or increased after the British policy interventions (France). In the latter case, this was most likely driven by supply conditions in the French market following emancipation in 1848.

Table 4.6 displays the results of [3] run on the annual data with the expanded control group. I include only the coefficients of the pre- and post-trends. The results of this exercise are generally less robust than those of Table 4.5, given that the pre-treatment window is only three years for France and Hamburg. They do, however, confirm the finding that the trends observed above were largely characteristic of the British market. Due to the lower frequency of observations, the level change followed by reversion trend is less pronounced in the annual British series, and post-trends following each treatment, bar the abolition of the Brazilian slave trade, are positive and increasing in size. Unlike the case of the New York series, the parallel trends assumption is violated: the difference between the pre-trends is statistically significant in all cases. In fact, the United Kingdom was the only country that demonstrated a positive pre-trend. Furthermore, excepting Hamburg in 1834, all post-trend differences are positive (and in most cases statistically significant), indicating that the post-treatment increase in imports of Brazilian sugar was faster in the British market than any of the controls. This is particularly noticeable in the period following the Sugar Act, when post-trend differences ranged from 57 to 99 thousand metric tons per year. As an additional robustness test, I run a simple differences-in-differences estimation with country fixed effects using the same data for each of the treatment points and examine the size and direction of the effect when the treated country is changed. The results show that the treatment effect is only positive and statistically significant in the case of the United Kingdom.[245]

[245] The results are reported in appendix 4.2.

MARKET SHARE TRENDS, PRICE COMPETITIVENESS, AND SHIPPING NETWORKS

The recognition that the performance of Brazilian sugar in the British market following slave emancipation was considerably distinct from that of other markets raises an additional question: why was the growth of Brazilian sugar largely confined to the British market? In the case of the Continental European market, the answer provided by the literature is simple: cane sugar was gradually substituted by subsidised domestic beet production. [246] The case of the American market, however, is different. Although the first half of the century witnessed the expansion of cane sugar production in Louisiana, by the late-1840s the volume of American domestic production only represented 20 per cent of the volume of unrefined cane sugar imports. [247] Thus, during the period under analysis, foreign, unrefined cane sugar remained the principal input of domestic refining and consumption in the United States. Yet, Brazilian sugar failed to make important inroads into the American market. The conventional explanation for this performance is that the inefficiency of Brazilian sugar production prevented it from competing with other slave-based economies, principally Cuba. Indeed, productivity in terms of output per slave, was no doubt higher in Cuba than in northeastern Brazil for most of the nineteenth century.[248] Yet, as we have seen, the Brazilian northeast experienced an unprecedented export boom following British slave emancipation. Growth under these conditions suggest that there were factors, outside of productivity, that gave Brazilian planters a competitive advantage in the British market.

Indeed, market share trends in the United States and Hamburg indicate that Cuban competition substantially reduced the demand for Brazilian product in markets

[246] Deerr, *History, Vol. 2*, pp. 492-494.
[247] Eisenberg, *Sugar Industry*, pp. 237-240.
[248] Eltis, *Economic Growth*; Denslow, 'Sugar Production;' Eisenberg, *Sugar Industry*.

undistorted by colonial preferences. In New York, Pernambuco's share of the market dropped from four percent during the period 1827-33 to two per cent during the fourteen years following British slave emancipation. Cuba's share, however, rose from 25 to 40 per cent over the same period. Apart from Brazil, Cuba's rise came mostly at the expense of St. Croix, in the Danish West Indies, which declined from 17 to eight per cent of the market share.[249] Market share trends on the national level were similar, although Brazil's market share was higher (seven per cent in 1827-33, down to five per cent in 1834-48), and Cuban dominance more pronounced (from 40 to 48 per cent shares over the same periods). When coupled with Puerto Rico, the Spanish West Indies held just under 80 per cent of the American market during the post-British emancipation period. In Hamburg, Brazilian sugar held over half the market in 1831 (54 per cent). Cuban sugar overtook Brazilian sugar in relative terms during the 1840s, although the total imports of both countries gradually declined with the growth of domestic beet sugar production.

These market share trends suggest that the more efficient Cuban sugar industry was able to price Brazilian planters out of these markets. During the period before mid-century, however, Cuban productivity advantages did not translate into price competitiveness relative to Brazilian sugar. We have already seen (Figure 4.4) that Brazilian muscovado was cheaper than its Cuban counterpart in the British market. Figure 4.6 shows that the same was true for the wholesale prices of Brazilian and Cuban muscovado in New York and Hamburg, taken from the *Shipping and Commercial List* and *Börsen-Halle*, respectively. In the case of New York, prices of Brazilian sugar remained below those of Cuba until the early-1840s, when prices ceased to be quoted. Both Brazilian and Cuban sugar, however, were regularly outpriced by domestic

[249] The market share of imports from New Orleans also fell (from 44 to 28 per cent) although it is unclear whether these are re-exports from the Caribbean or imports of domestically produced cane sugar.

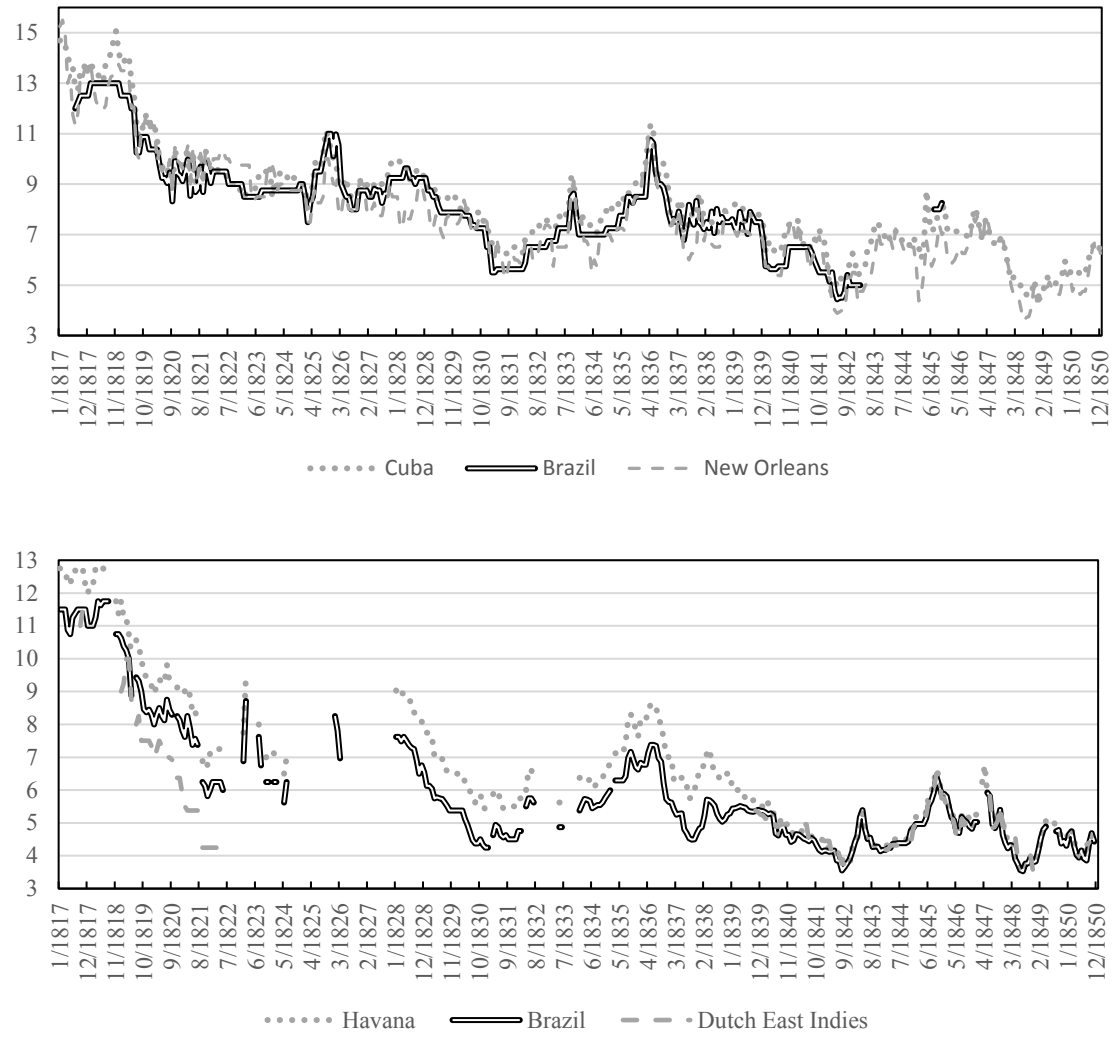


Figure 4.6. *Wholesale prices of muscovado sugar in a) New York ($/cwt), b) Hamburg (groot/pfund), monthly, 1/1817 to 12/1850*

Notes: Full series p. 353. For Hamburg, Brazilian sugar is the average of price quotations of Rio de Janeiro, Bahia and Pernambuco muscovado. For New York, prices for the period 7/1820 to 12/1821 have been interpolated using an index of average prices in Philadelphia, taken from Bezanson et al., *Wholesale prices*. *Sources*: New York: *Shipping and Commercial List and New York Price Current*; Hamburg: *Börsen-Halle*.

muscovado imported from the port of New Orleans. In the case of Hamburg, Brazilian sugar was also considerably cheaper until 1839. While muscovado from the Dutch East Indies (most probably Java) was cheaper than both Brazilian and Cuban varieties, prices were intermittently quoted, suggesting the absence of product from the market.

If Brazilian sugar was truly price competitive, what explains its failure to achieve market share gains in the American market? A possible answer involves the characteristics of both British and American nineteenth century shipping networks. Northeastern Brazil imported more from Great Britain than the United States, and Cuba vice versa.[250] Since virtually all this trade was undertaken in British and American vessels, respectively, the large share of these countries in Brazilian and Cuban imports generated concentration in the supply of shipping. Data for the ports of Bahia and Pernambuco indicate that the Brazilian import trade was dominated by British shipping by the mid-1830s. In 1835, 59 British ships entered Pernambuco, carrying 32 per cent of the total tonnage. The figures for Bahia were 101 ships carrying 38 per cent of the tonnage. American vessels accounted for smaller shares of the import trade: in Pernambuco, the American share of total tonnage was 22 per cent, while in Bahia it was 11 per cent. [251] The opposite was true for Cuba. In the case of Havana in 1833, 509 American ships accounted for 54 per cent of the tonnage, which contrasted with 59 British ships holding a share of only five per cent.[252] In both cases, the greater supply of shipping served to lower transaction costs in terms of freight and insurance. Thus, the predominance of British shipping in Bahia and Pernambuco resulted in a greater propensity to export to the United Kingdom. The same was true for Cuba and the American market.[253] During the first half of the nineteenth century, Brazilian sugar gravitated towards the British market, and Cuban sugar towards the United States, not

[250] Imports from Great Britain to Bahia accounted for 67 per cent of the total value in 1835 (United Kingdom, *Tables…1835*, p. 437). The United States occupied 31 per cent of the total value of Cuban imports in 1833, while England held 11 per cent (United Kingdom*, Tables ... 1820-33*, p. 648).
[251] The share calculations for Bahia and Pernambuco do not include Brazilian vessels, which were largely relegated to the coastwise trade.
[252] United Kingdom, *Tables ... 1820-33*, p. 650; *Tables ... 1835*, p. 437; *Tables ... 1836*, p. 390.
[253] On the American presence in early-nineteenth century Cuba, see Marques, *The United States*, pp. 109-110; Pérez Jr., *Cuba*, Chap. 1.

because of any competitive advantage derived from supply-side conditions, but rather because of pre-existing shipping networks derived from the import trade.[254]

CONCLUDING REMARKS

This paper has shown that the policies surrounding British slave emancipation were associated with a rapid increase in both the demand for Brazilian sugar in the British market and the supply of sugar from the Brazilian northeast. While slave-grown Brazilian sugar benefited from slave emancipation in the British West Indies in the short-run, the northeast's long-term growth prospects were grim. As the century wore on, increased British demand for cheap Brazilian sugar, together with declining demand in other markets, resulted in increased dependence on a market that would be eventually saturated by subsidised European beet sugar. What's more, the structure of British tariffs following emancipation – designed in the interests of British refiners - incentivised Brazilian planters to specialise in lower grade muscovado, so that by the final quarter of the nineteenth century, Brazilian producers were stuck selling low quality product to a steadily shrinking market. Consequently, by the eve of the First World War, sugar occupied less than one per cent of the value of Brazil's total exports.

The results of this study generate a set of questions that may foment further research on the economic effects of slave emancipation. The literature on globalisation has shown that the process of market integration, driven fundamentally by the reduction of trade and information costs, leads to large scale redistribution effects. Concretely, the removal of trade barriers may reconfigure comparative advantage dynamics in favour of those producers with higher factor intensities.[255] Outside of the export boom described

[254] This, of course, would change from mid-century with the expansion of the railroads and modernisation of the sugar industry in Cuba. Zanetti and García, *Sugar*; Santamaría García and Álvarez, *Economía*.
[255] O'Rourke and Williamson, *Globalization*.

above, what were the consequences for slave-based sugar producing economies of the rapid integration into the British economy? An interesting empirical question is whether land values converged between free and slave regimes after tariff reform. Did the value of land rise in Brazil and Cuba, and decline in the old British colonies (as contemporary opinion would suggest)? Another question concerns the effect of emancipation across commodities. Did other, slave-grown commodities (coffee, cacao, cotton, tobacco) experience similar growth dynamics following emancipation, or was growth merely confined to the sugar industry?

5

The rise of coffee in the Brazilian southeast: tariffs and foreign market potential, 1827-1840

Abstract. During the period spanning independence in 1822 to mid-century, Brazil's southeast shifted from specialising in the export of cane sugar to coffee. This paper explores the mechanism underlying this shift by exploiting a wealth of new monthly data on the Brazilian and international coffee and cane sugar markets during the period from 1827 to 1840. I argue that the timing of the boom was driven by a rapid increase in the foreign market potential of coffee associated with the abolition of the tariff on coffee in the United States. I estimate that American tariff reform served to increase the volume of coffee exports by around one-third and African slave imports by one-quarter. American firms, with indirect links to the slave trade, rapidly became major players in the export market in Rio de Janeiro, while non-American firms, traditionally specialised in Continental European destinations, turned their sights on the American market.

Coffee's role in determining long-run paths of development in the Americas has long been a complicated one. Like other colonial cash crops, coffee is considered a 'bad' commodity in the sense that its rise in the nineteenth century is associated with the intense exploitation of African slave labour.[256] In comparison with the experiences of other tropical commodities, notably cane sugar, however, coffee has also been associated with 'good' long-run outcomes. Historically, regions specialising in coffee have followed radically different pathways of development to those specialising in other tropical commodities. While sugar producers have generally suffered from higher degrees of land concentration and inequality,[257] the experience of coffee regions has been more heterogenous.[258] Not only has coffee production been associated with more equitable tenure systems. Through fiscal and foreign investment channels, coffee has also been linked with increased investment in infrastructure, the emergence of industrial centres and urbanisation, and the increased provision of public goods.[259]

There is no better example of the ambiguous relationship between coffee and long-run development than that of the world's premier nineteenth century coffee producer: Brazil. By the final decade of the nineteenth century, Brazilian coffee occupied 70 per cent of the country's composition of exports and over half of the world export market share. While plantations during the latter half of the nineteenth century until the abolition of slavery in 1888 would come to resemble the size of sugar plantations in the northeast and Spanish Caribbean, early coffee growing was a somewhat more egalitarian affair.[260] What's more, despite attracting the lion's share of slave imports prior to the

[256] Bruhn and Gallego, 'Good, bad and ugly.'
[257] Sokoloff and Engerman, 'Institutions;' Easterly, 'Inequality.'
[258] Ocampo and Colmenares Guerra, 'Export and economic development;' Nugent and Robinson, 'Are endowments fate;' Bates, *Open Economy*.
[259] Cárdenas and Yanovich, 'Café y desarrollo económico.' An important exception is Puerto Rico. See Bubonis, 'Bitter coffee.'
[260] As Francisco Vidal Luna and Herbert Klein showed, during the period when coffee was becoming the major export commodity, only half of the producers were employing slave labor. This situation changed

closure of the Brazilian slave trade in 1850, and bidding away a large proportion of the northeast's slave labour thereafter, the emergence and consolidation of the coffee economy in the southeast has been linked to the better long-run economic performance of the region with respect to the rest of the country. Over the nineteenth century, coffee stimulated investment in the railroads, attracted hundreds of thousands of Southern European immigrants, and provided the Brazilian southeast increased purchasing power to obtain imported goods, including inputs for nascent industrial activity.[261] Coffee generated fiscal revenue that was channelled into the provision of public goods, notably education expenditures.[262] On the other hand, sugar generated important inequalities in the distribution of land, public goods, and access to justice.[263] Consequentially, by 1950 per capita incomes in the northeast were half of that of Rio de Janeiro and around a third of that of Sâo Paulo, a distribution that persists to the present day.[264]

Given the importance that coffee plays in Brazil's long-run economic development, there is remarkably little empirical literature on the timing of its emergence. Although it is well known that coffee overtook sugar as Brazil's principal export commodity in terms of value during the 1830s, there is virtually no explanation of why this occurred when it did. Supply-side explanations of the rise of coffee – and they are abundant – are essentially static, focusing on the relative agricultural efficiency of coffee.[265] Although cane sugar enjoyed a geographical advantage in the fact that it could

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rapidly after 1836, however, as slaveholdings came to resemble those of sugar. Klein and Vidal Luna, *Slavery and the economy*, p. 53. See also Stein, *Vassouras*; Salles, *Vale*, pp. 155-169. For classic treatments of the sugar plantations of the northeast, see Eisenberg, *Sugar Industry*; Barickman, *Bahian Counterpoint*; Schwartz, *Sugar Plantations*. On Cuba and Puerto Rico, see Bergad, *Cuban rural society*; Figueroa, *Sugar*.

[261] Leff, *Underdevelopment*; Summerhill, *Order*; Corrêa do Lago, *Escravidâo*; Dean, *Industrialization*; Silva, *Expansão*.

[262] Musacchio et al., 'Colonial institutions.'

[263] Naritomi et al., 'Institutional development.'

[264] Baer, 'Regional inequality;' IBGE, 'Regional accounts;' Monasterio, 'Brazilian spatial dynamics.' Moreover, by the twentieth century real wages in the southeast were around 50 per cent higher than those in the northeast. Pereira, 'North-South.'

[265] Furtado, *Formación*, p. 121; Medeiros Lima, 'Cafeicultores;'; Klein and Vidal Luna, *Slavery*; Viotti da Costa, *Senzala*, p. 67; Marcondes, *Arte*.

be grown along the littoral areas facing the Atlantic Ocean and did not have to traverse the rugged hinterland terrain where coffee prospered, the latter was characterised by lower unit labour requirements. Additionally, coffee required a lower initial investment, permitting entry for those who could not afford the fixed costs of establishing a sugar mill.[266] Other characteristics of production and distribution, such as fuel requirements, mixed cropping, transport costs and perishability, favoured coffee over sugar. On the demand side, certain authors have observed that prices shifted in favour of coffee in the Brazilian southeast during the early nineteenth century, affecting relative rates of profitability.[267] As Nathaniel Leff succinctly hypothesised, 'Brazilian comparative advantage and the rates of return available in the country's different export activities during the nineteenth century favored coffee as against sugar and cotton.'[268] This apparently had much to do with external conditions: that Brazilian coffee emerged at a time when world demand, especially in the United States and Central Europe, was expanding, and that the composition of world supply, from Haiti, the British and Spanish West Indies, was undergoing profound changes.[269] Conditions in the United States, where coffee was rapidly becoming an object of mass consumption, were particularly propitious.[270] For sugar, prices and, thus, profitability, were lower, due to intense competition from Caribbean, Asian, and domestic cane and beet producers.[271]

This paper presents an alternative, empirically founded argument on the timing of the nineteenth-century Brazilian coffee boom. By exploiting a new database of monthly

[266] As the British pro-consul in Rio de Janeiro observed in 1848, 'This article of produce [coffee] is found to be much more productive to the planters than any other, is easier cultivated, and does not require so much capital and labour as sugar; besides which the climate of this province and vicinity is particularly adapted to the cultivation of coffee, while on the other hand the flat land in the provinces of Bahia and Pernambuco suit the growth of sugar…' United Kingdom, *Copies*, p. 443.
[267] Petrone, *Lavoura*; 'Comerciante;' Dean, *Rio Claro*.
[268] Leff, 'Economic development,' p. 252.
[269] Topik, 'World coffee market;' Klein and Vidal Luna, *Slavery*; Corrêa do Lago, *Escravidâo*, pp. 110-111; Marquese, 'Origens;' Marquese and Tomich, 'Vale.'
[270] Topik, 'Integration;' McDonald and Topik, 'Americanizing.'
[271] Galloway, 'Sugar industry;' Denslow Jr., 'Sugar production;' Deerr, *History*.

exports, imports and prices for the period from 1827 to 1840, it is shown that changes in the export structure of Brazil's southeast during the first half of the nineteenth century accorded with improvements in the foreign market potential of coffee. In July 1832, coffee was granted duty-free status in the United States. The resulting expansion of American coffee market potential led to a shift in the southeast towards the more efficient sector – coffee – and a rapid shift in the geographical distribution of the southeast's exports towards the American market. Increased access to the American market provided an incentive for entry into the coffee market back home in southeastern Brazil.[272] American tariff reform led to the expansion of the contraband slave trade, outlawed by the Brazilian government in 1831. It also resulted in the radical alteration of the composition and behaviour of export firms operating in Rio de Janeiro. The potential of the sugar market in the United States, and in other important markets, such as Great Britain and Hamburg, was lower, due to higher barriers produced by tariffs, geography, and market distortions derived from monopolistic forms of competition.

The structure of the paper is as follows. Using a new series of monthly exports of coffee and sugar from the port of Rio de Janeiro, the next section establishes the timing of the southeast's export specialisation. The following section examines conditions in the American market for coffee and constructs a measure of market potential for coffee and sugar for New York, Liverpool and Hamburg using new series of imports and trade costs. I then establish a causal relationship between American tariff reform and the Brazilian coffee boom using standard intervention analysis methodology, and present counterfactual estimates of coffee exports and slave imports in the absence of American

[272] The importance of the tariffs is also discussed in Topik, 'Integration;' Marquese, 'Estados Unidos.'

tariff reform. The composition and behaviour of the principal firms exporting coffee from Rio de Janeiro is briefly explored. The final section concludes.

THE TIMING OF THE EXPORT BOOM

Table 5.1 provides a rough periodisation of the rise of coffee, including benchmark estimates of coffee and sugar exports from Rio de Janeiro, São Paulo, Bahia and Pernambuco during the first half of the nineteenth century. Coffee was a minor export commodity during the period 1796-1811, occupying around two per cent of Brazil's total export value. Sugar and cotton remained the most important exports of the late-colonial period, holding shares of 35 and 24 per cent of the composition of exports, respectively. Rio de Janeiro occupied one third of Brazil's total exports, followed by Bahia (22 per cent) and Pernambuco (19 per cent). The leading exporter of sugar was Bahia, followed by Rio de Janeiro and Pernambuco.[273] Evidence for the period from the liberalisation of Brazil's ports in 1808 to political independence in 1822 is fragmentary, but allow for a descriptive sketch. Coffee exports seem to have grown rapidly in Rio de Janeiro with the end of the Napoleonic Wars: the exports of 1,574 metric tons in 1807, the highest for the period 1796-1811, rose to 7,885 on the eve of independence.[274] Sugar, however, also followed similar growth tendencies, and the quantum of exports in Rio de Janeiro, Bahia and Pernambuco remained around twice that of coffee.

The definitive shift in the southeast's export composition occurred during the period 1825-36. Between these years, coffee exports from both Rio de Janeiro and São Paulo quadrupled. In fact, the 1820s and 1830s were the most dynamic decades in terms

[273] Arruda, *Brasil*, pp. 292, 353-354, 359, 374, 417.
[274] Corrêa do Lago, *Escravidão*, p. 460.

Table 5.1. *Exports (in metric tons) of coffee and sugar from Rio de Janeiro, São Paulo, Bahia and Pernambuco, selected years*

	Rio de Janeiro		São Paulo		Bahia		Pernambuco
	Coffee	Sugar	Coffee	Sugar	Coffee	Sugar	Sugar
Av. 1796-1811	642	7,809	-	-	72	9,577	6,791
1817	4,672	-	-	4,323	-	14,838	7,369
1825	13,447	22,939	2,081	5,046	-	20,401	7,099
1836	52,582	17,989	8,640	8,272	757	18,693	26,539
1848	95,569	8,814	19,547	4,096	1,280	49,165	61,286

Notes: São Paulo 1817 sugar is the export volume for the year 1818. The 1836 figure for sugar from Rio de Janeiro is an upper bound estimate; estimates by Soares and Maxwell, Wright & Co. being 16,312 and 17,175 metric tons, respectively. Figures for coffee for São Paulo include exports from Rio de Janeiro, as most of the exports from the Paraíba Valley were not shipped from Santos. Figures for Bahian sugar are production, not export, estimates. The same can be said for São Paulo 1836 coffee and sugar. *Sources*: Arruda, *Brasil*, pp. 359, 374, 417; Soares, *Notas*, p. 208, 216, 228, 241, 254-255; Corrêa do Lago, *Escravidão*, pp. 156, 460, 483-585; Maxwell, Wright & Co., *Commercial Formalities*, p. 87; *Jornal do Commercio*, Edição 3, 1840; Petrone, *Lavoura*, p. 156; United Kingdom, *Abstracts*, p. 606.

of nineteenth-century coffee export growth. Exports of sugar from these regions, however, declined to pre-independence levels by mid-century. In Bahia and Pernambuco, on the other hand, sugar exports increased. In the Bahian case, coffee exports also showed a rapid increase from late-colonial levels, although the volume shipped remained dwarfed by that of sugar.

Rio de Janeiro was the centre of the export boom. As Table 5.1 shows, the port exported the lion's share of coffee to the world market and, until the 1830s, closely trailed the northeast in the export of cane sugar. Thus, the analysis of the mechanisms underlying the shift in specialisation from sugar to coffee must focus on what was occurring in the Rio de Janeiro export market. To capture the subtleties of this shift, high frequency data are necessary. Here I introduce a new database of monthly exports of coffee and sugar from Rio de Janeiro to foreign ports spanning the period from July 1826 to December 1840.

The series is taken from contemporary periodicals widely read by the mercantile community in Rio de Janeiro, the principal source being the *Jornal do Commercio*. These newspapers reported the daily movements of the port, including imports and exports within and outside of the Empire, as well as the nationality and destination of the ships. Although never explicitly stated, this information was presumably gleaned from the *Mesa do Consulado*, which reported the volume of commodities entered for export, and used these volumes, along with a list of official prices, to collect export taxes. The fact that these volumes were the basis of the calculation of the government's fiscal revenue derived from exports, and that the movement of commodities was so widely disseminated in the press, lends confidence to the quality of the data. For much of the period under analysis, the *Jornal* conveniently published monthly summaries of foreign trade, from which much of the series is taken. In some years, these reviews were not published, and instead the daily data has been collected.[275]

There are several problems with the data. Firstly, there are gaps in the series, including months in 1828, 1829, 1832, 1829, the first seven months of 1830 and all but March of 1831. While the nationality and destination of the ships leaving port were listed during these years, the commodities and volume exported were not included. To calculate a continuous monthly time series, I have interpolated the missing months using a multiplicative seasonal factor derived from regressing the natural log of each country series on a full set of month dummies.[276] Another important problem is the source of exports. Being the southeast's principal port, Rio de Janeiro exported coffee and sugar from other provinces, including Minas Gerais and São Paulo. Given the nature of the data,

[275] Volumes have been converted to metric tons. For a detailed list of weights and measurement conversions, see Appendix 5.1.
[276] See appendix 5.1 for a full explanation.

it is impossible to confirm the true origin of the export data presented here.[277] Thus, the data should be interpreted as representing regional (southeastern) exports, rather than exports strictly from Rio de Janeiro. Additionally, the sources do not specify the quality of commodity exported, especially a problem for sugar, which might have arrived in the muscovado, yellow, or white forms. We know, however, that American and European importers preferred muscovado, as subsequent refining was undertaken by national industry.[278] Thus, it is likely that most of the sugar exported was of the lower quality.[279] Furthermore, the destinations listed may have been merely entrepôts, such as Cowes, the Cape of Good Hope, Açores or Madeira. This is particularly a problem for the British series. On paper, the United Kingdom received an average of 23 per cent of coffee and 19 per cent of sugar exports over the period. Brazilian exports that did arrive to mainland British ports (London or Liverpool) were subjected to prohibitive tariffs, and thus were most likely re-exported to the Continent. This seriously distorts the geographical distribution of exports and warrants correction. [280]

Figure 5.1 displays the resulting series of the total volume of coffee and sugar exported outside of the Empire from the port of Rio de Janeiro from July 1826 to December 1840. The figure shows both the monthly observations of total volumes and a three-month moving average. In terms of total volume, coffee overtook sugar from mid-1827 onwards. This accords with the series by Robert Walsh published in 1830, and reproduced by Luiz Aranha Corrêa do Lago, which showed that coffee had already

[277] Corrêa do Lago, *Escravidâo*, p. 518. Data quoted in the *Jornal do Commercio* in 1831 indicate that exports from Rio de Janeiro occupied 93 per cent of the total volume, while those from Minas Gerais and Sâo Paulo constituted four and three per cent, respectively. See *Jornal do Commercio*, 1832, Ed. 101, p. 2.
[278] On the British case, see Curtain, 'British sugar duties,' p. 158; Sturz, *Review*, pp. 120-136; Barickman, *Bahian Counterpoint*, Chap. 7.
[279] Unfortunately, the official sources that are available for the 1840s do not differentiate between qualities of sugar. Brazil, *Collecção*.
[280] See appendix 5.2 for a discussion of the correction of the series for British re-exports.

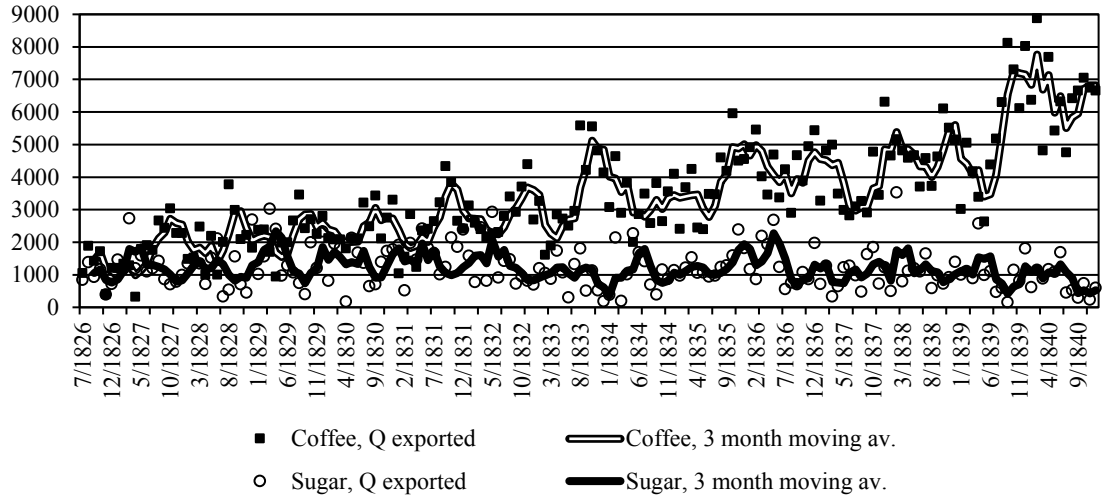


Figure 5.1. *Volume (in metric tons) of coffee and sugar exported from Rio de Janeiro, 6/1826-12/1840*

Notes: Full series p. 363. *Sources*: 1826: *Diario Mercantil*; 1827-6/1840 *Jornal do Commercio*; 7-12/1840: *O Despertador*.

overtaken sugar by 1828.[281] The divergence in export performances, however, did not become sustained until around 1833, when the ratio of coffee to sugar exports began to climb steadily higher. This trend is further illustrated by the calculation of average growth rates over the period. The volume of coffee exported during the period grew by an average of 12 per cent, while that of sugar contracted by two per cent. Average growth was extremely rapid for coffee during the late-1820s, dropping off and picking up again in the mid-1830s. While the first half of the 1830s was good to sugar, growth declined from 1835 onwards. The 1830s were years of rapid growth for coffee (at an average of nine per cent) and moderate contraction for sugar (at three per cent). Years of contraction were far more frequent for sugar than for coffee, and the average degree of contraction far greater (15 and seven per cent negative growth rates, respectively). It is evident that the shift from sugar to coffee in the southeast was in full swing by the mid-1830s.

[281] Corrêa do Lago, *Escravidão*, pp. 459-460; Walsh, *Notices*, pp. 535-536.

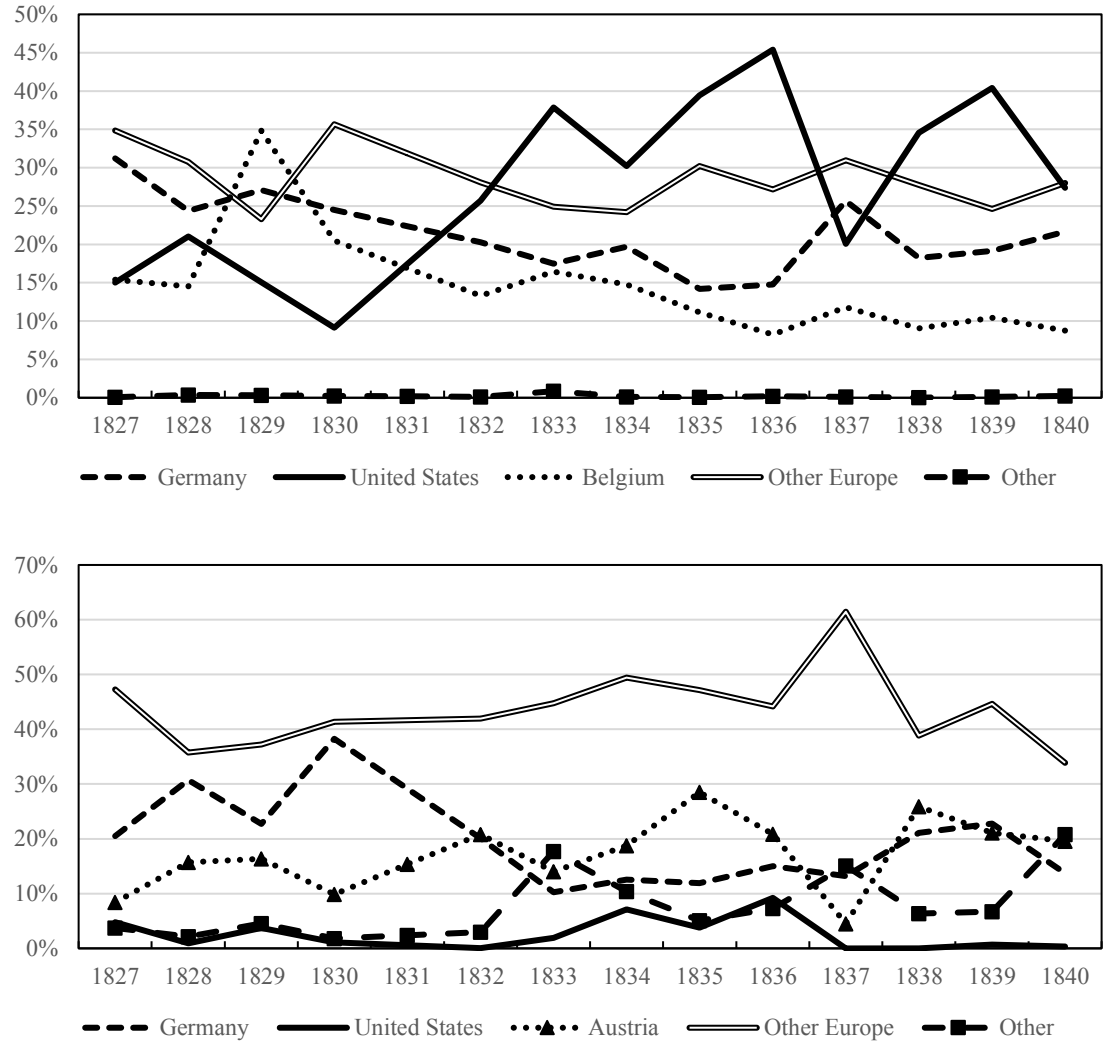


Figure 5.2. *Shares (%) in total exports of coffee (above) and sugar (below) from Rio de Janeiro, 1827-1840*

Notes: Full series p. 381. These shares are corrected for missing observations and the presence of British re-exports. See appendix 5.2 for full explanation, and appendix 5.3 for port composition of destinations. *Sources*: same as figure 5.1.

Figure 5.2 provides the series of the geographical distribution of coffee and sugar exports, corrected for the presence of British re-exports. Before the abdication of Pedro I in 1831, around 60 per cent of Rio de Janeiro's coffee was shipped to ports in the United States, Belgium (Antwerp), and the Hanseatic Cities (Hamburg). The remainder was shipped to destinations in Europe, the most important being the Austrian Empire (Trieste). Minor shipments were also made to ports in Africa (principally Angola) and the Rio de

la Plata. The 1830s witnessed a considerable shift in the composition of coffee exports in favour of the United States. In the early-1830s, the share of the United States rocketed from around 15 per cent to occupy almost half of total exports. In fact, from 1831 onwards, the United States and Hanseatic Cities alone occupied over half of all coffee exports. The geographical profile of sugar exports was considerably distinct. Exports to the United States were unimportant. The Austrian Empire, Portugal, and the Hanseatic Cities imported most of Rio de Janeiro's sugar, while Buenos Aires and Montevideo became important destinations after 1832.

TARIFFS AND MARKET POTENTIAL

The timing of the abolition of tariffs on coffee in the United States is fundamental for understanding the subsequent commodity boom that took place in Rio de Janeiro. American tariffs on coffee were gradually reduced from five cents per pound (an ad-valorem equivalent of 34 per cent in 1827) to duty-free status during the period 1828 to 1832. Imports of coffee into the United States doubled between 1830 and 1835, while the geographical distribution of imports rapidly skewed in favour of Rio de Janeiro. The expansion of American coffee consumption provided a lucrative incentive for southeastern producers to cultivate. No such event occurred for cane sugar. Until the British Sugar Act of 1846, the virtual exclusion of southeastern sugar from all but a few markets remained business as usual.[282]

American society in the 1830s was ripe for the acceptance of coffee as an object of mass consumption. Lobbying from temperance groups aggressively discouraged the use of whiskey. Tea was expensive and, for those with nationalist sentiments, unpalatably

[282] On the effects of the British Sugar Act, see 'British slave emancipation;' Batista Jr., 'Política tarifária;' Curtain, 'British Sugar Duties.'

British.[283] Unlike cane sugar, the cultivation of which constituted an important part of the Southern slave-based economy in Louisiana, Americans were dependent on foreign countries for their supply of coffee.[284] This combination of factors undoubtedly served to place pressure on legislators to abolish the import duty on coffee. During a Congressional hearing regarding the tariff in January of 1833, a representative of Massachusetts pointed to these factors as prime motivators of abolition, arguing that 'The great and glorious temperance reformation … will greatly increase the use of tea and coffee as a substitute for ardent spirits … I hope that we may not … check a reformation essential to national honor, character, and salvation.' Furthermore, he observed that '…coffee and tea do not come in competition with any production of our country… They are of great value; may be safely kept for a long time; and coffee improves by age.'[285] Tellingly, foreign (raw and refined) sugar received no such treatment. Although tariffs on foreign muscovado sugar were reduced from three to two and a half cents during the same period, falling prices ensured that the ad-valorem equivalent remained steady (at around 37 per cent).[286]

The gradual reduction of duties from five cents per pound to two in May 1828, to one cent per pound in May 1830, and final abolition of the duty in July 1832, together with coffee's declining price in the United States, which continued until mid-century, meant that for the first time coffee was affordable for the general population. The average duty-paid price of coffee declined from a peak of 38 cents per pound in September 1818 to 18 cents in April 1825 (Figure 5.3). Prices were then almost halved between the first and second reduction of duties in 1825 and 1830. Demand pressure seemingly slowed the pace of decline thereafter, although the trend of average prices continued its downward

[283] Rorabaugh, *The Alcoholic Republic*; 'Estimated;' McDonald and Topik, 'Americanizing.'
[284] On the antebellum Louisiana sugar industry, see Follett, *Sugar Masters*; Schmitz, 'Economies of scale.'
[285] United States, *Register*, p. 1184.
[286] United States, *The existing tariff*, pp. 136-137, 156-157.

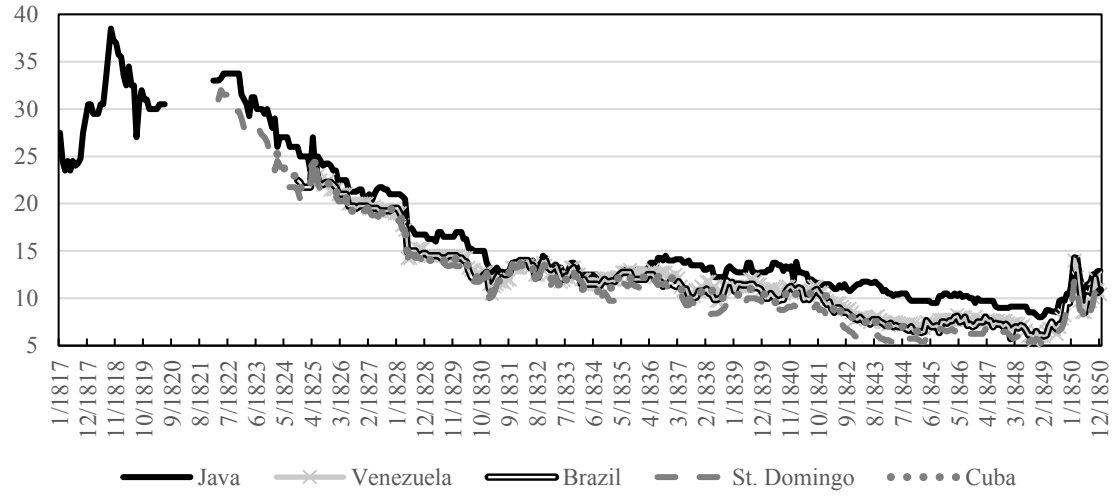


Figure 5.3. *Prices (c/lb) of coffee in New York, duty-paid, monthly, 1/1817-12/1850*

Notes: Full series p. 384. *Source*: *Shipping and Commercial List and New York Price Current*.

drift, reaching a half-century low of six cents per pound in October 1848. Price competition was fierce, and the price of Brazilian coffee lay between the expensive Javanese and the cheaper Haitian varieties.[287]

The rapid decline of prices and consequent expansion of consumption generated a social reaction that was equally as caffeinated:

> Coffee is all the gow now. The first thing that fixes the eye in the price current is coffee! And the last object it lingers upon is coffee! If you listen to a group of conspirators, why the only word that becomes audible is coffee! If you hear any man's having made a good speculation, why 'tis in coffee! If any one thinks of getting married in this cold and extravagant time, it is upon the strength of coffee! If any one preaches against intemperance, his text is coffee! The substitute is coffee! The antidote coffee! The means of salvation coffee! … While we 'calculate the value of the Union,' let us ever bear in mind how deeply we are indebted to the eloquence of coffee![288]

[287] Except for West Indian product, which ceased to be quoted in the 1830s, the *Shipping and Commercial List* did not quote prices by grades. Furthermore, St. Domingo quotations include the annotation 'in cash,' which may indicate some form of exchange discount.
[288] *Boston Gazette and Daily Advertiser*, 27/12/1831, p. 3.

The immediate effect of the American policy interventions in the coffee market of the early-1830s was the doubling of per capita consumption. Between, 1830 and 1835, per capita consumption had increased from three to six pounds per year. This increase translated into an additional hundred cups of coffee a year, raising per capita consumption to an average of around half a cup a day.[289] The American share of world imports rocketed from around seven per cent in 1823 to 24 per cent in 1835 and hovered around one fifth until mid-century,[290] quickly converting the United States into 'the world's greatest coffee market.'[291] The main supplier of this vertiginous rise in consumption was the port of Rio de Janeiro. On the national level, Brazil rose from occupying around six per cent of the volume of total imports around the time of its political independence, to 70 per cent by mid-century.[292] Import data for the port of New York, which, besides Baltimore, was the leading destination for American coffee imports, show that Rio de Janeiro´s share more than doubled during the period 1825-30 to 1836-40, from 14 to 41 per cent. This came at the expense of Cuba, which all but disappeared from the market and, to a lesser extent, Santo Domingo.[293]

In comparative terms, the United States was exceptional in its progressive attitude towards the coffee tariff. Indeed, for producers in southeastern Brazil on the eve of the first globalisation, tariffs on non-colonial coffee and sugar were the principal barriers to

[289] Of course, not everybody consumed coffee, so these consumption estimates are most likely undervalued. See appendix 5.4 for estimates of coffee consumption.
[290] Calculated as the share of United States' imports in total world exports of coffee. This assumes that world exports = world imports. World exports taken from 'Brazilian export growth.' For estimates of world import market shares and per capita consumption for the second half of the century, see McDonald and Topik, 'Americanizing,' p. 118.
[291] Topik, 'Coffee,' p. 95; Marquese, 'Estados Unidos,' p. 55.
[292] United States, *Commerce and Navigation*.
[293] Data taken from the *Shipping and Commercial List and New-York Price Current*. The New York series includes re-export data. Re-exports from New Orleans and other ports on the east coast most likely include Brazilian product, so the share calculation presented here may be biased downwards. Baltimore was initially the principal destination for coffee exports from Rio de Janeiro, occupying 42 per cent of total exports to the United States during the period 1827-30. During the first half of the 1830s, however, this share would decrease to equal that of the New York share, at 34 per cent. In the second half of the decade, New York would rise to become the principal destination, receiving 43 per cent of the southeast's exports.

Table 5.2. *Tariffs on non-colonial imports of coffee and brown sugar, percentage of price, 1841*

	Coffee	Sugar
	Europe	
Hanse Cities	0.5	0.5
Belgium	16.7	2.9
'Italy'	46.8	27.7
Austrian Empire	68.5	48.0
Portugal	17.7	21.7
	Imperial Europe	
Netherlands	6.7	37.3
Spain	84.3	191.6
United Kingdom	264.3	233.2
Denmark	14.2	23.3
Sweden	21.0	46.1
France	68.3	91.7
	Americas	
United States	0.0	41.2
Uruguay	24.5	24.5
Chile	35.0	35.0

Notes: The price used to calculate the ad valorem equivalent is the unweighted average of average prices in New York, Philadelphia, Liverpool, Hamburg and Amsterdam in 1841, sources from Figure 2. In some cases, different tariffs were given for national and foreign vessels. I have taken the average of these. 'Italy' is the average of Sardinia, the Papal States, and Tuscany. The Chilean tariff on sugar was not given by MacGregor, so I assume that it was the same as coffee. *Source*: MacGregor, *Commercial Statistics*.

entry in several of the most important European markets. Table 5.2 shows the ad valorem equivalent of tariffs on non-colonial coffee and brown sugar in 1841 for Brazil's principal trading partners. As most tariffs were given as specific duties (that is, duty per weight), I convert all duties to British shillings per hundredweight and apply this to the unweighted average of monthly prices for 1841 for New York, Liverpool, and Hamburg.[294] For both coffee and brown sugar, the tariffs in core Imperial Europe (the United Kingdom, Spain and France) were truly prohibitive. However, both within and outside of Imperial Europe, there was considerable heterogeneity of tariff levels. The tariff on coffee in the Netherlands was seven per cent, while that for non-Imperial Austria was 69 per cent. In terms of observable entry costs, the freest market in the world for coffee in 1841 was the

[294] The sources of the price data underlying this paper are: Hamburg: *Börsen-Halle*; New York: *Shipping and Commercial List and New-York Price Current*; Liverpool: *Liverpool Mercury*, *The Manchester Times and Gazette*, *North Wales Chronicle*. Exchange rates from Denzel, *Handbook*.

United States, followed by Hamburg for both coffee and sugar. Generally, with a few exceptions (Belgium, 'Italy', and the Austrian Empire) tariffs for brown sugar were higher than those for coffee.

In the American case, however, it was the dynamic interplay between the tariff, other trade costs, and consumption – the market potential of coffee – that provided the demand-side impetus to the expansion of cultivation in the Brazilian southeast. To ascertain the comparative size of American market potential, I estimate the market potential for both coffee and cane sugar for New York, Hamburg and Liverpool. The market potential measure used here is a version of Chauncy Harris' seminal formulation, which calculated the potential of a market as economic size divided by trade costs.[295] While Harris, and much of the literature that followed, weighted economic size by distance as a proxy for trade costs, the empirical reality is that trade costs were neither time-invariant nor directly related to distance.[296] I prefer a more empirically-founded (albeit data intensive) approach to measuring trade costs. Thus, I assemble data on freight rates, insurance costs, and tariffs for coffee and sugar exports from Rio de Janeiro during the period. The freight data, discussed in the second paper ('Reconstruction') and taken from the same sources as the Brazilian export data presented above, consists of monthly observations (mostly quoted in British shillings per ton) from Rio de Janeiro to Liverpool, London and Hamburg. Freight quotations to the American East Coast are remarkably absent from the sources (the first quote to the United States appears in November 1843). Freights to the United States from the 1840s closely followed those to European destinations.[297] I create an American freight series by discounting 18 percent from the

[295] Harris, 'Market.'
[296] On the theory behind and calculation of market potential, see Redding and Venables, 'Geography;' Liu and Meissner, 'Market potential;' Jacks and Novy, 'Market potential.'
[297] The correlation coefficient of American and British freights for the period from 7/1845 to 12/1850, when a continuous monthly series is available, is 0.89. American freights are quoted in cents per sack (of five

Liverpool series: the average difference between American and British freights for all available observations between November 1843 and December 1850.[298] An additional complication of the freight data is that quotes did not differentiate between commodities. This is not the case for freight rates quoted for Pernambuco and Bahia, which provided separate rates for cotton, hides and sugar.[299] As the sources for Rio de Janeiro do not indicate otherwise, I assume that the freight rates were the same for both coffee and sugar. To my knowledge, a monthly series of maritime insurance rates do not exist for New York, Liverpool and Hamburg. Therefore, I resort to insurance rates taken from Paul Schöller, which represent outgoing rates from Antwerp to Brazil.[300] Schöller's series displays a decline in insurance rates from 2.9 to 1.7 percent between 1827 and 1840, averaging two percent over the period. While the use of an outgoing series for a port not included in the sample may be questionable, partial evidence suggests that insurance rates were similar for other destinations and identical for both outgoing and incoming routes.[301] To calculate the market potential measure, I convert freights, insurance rates and specific tariffs (in the case of New York and Liverpool) to effective terms by dividing them over the average price of coffee and sugar in New York, Liverpool and Hamburg.[302]

In the absence of historical estimates of aggregate expenditure or income for the three cities, the total import of coffee and brown sugar from all destinations is used as a proxy for commodity-specific market size. Given that a monthly series of imports has not yet been gleaned for Hamburg, I present annual estimates from 1831 onwards taken from

arrobas). To permit direct comparability with the British series, I convert the American series to shillings per ton.

[298] The average ratio of American to British freights was 0.82, the standard deviation across the 72 available observations 0.16, the maximum ratio 1.21, and the minimum 0.46.

[299] See, for example, *Diário de Pernambuco* 1829, ed. 123, p. 3.

[300] Schöller, 'L'évolution.'

[301] See *Jornal of Commercio* 1827, Ed. 7, p. 3 for Antwerp, Ed. 22, p. 3 for London. Rates were also regularly quoted in the *Shipping and Commercial List* for New York to Brazil and are comparable to those quoted by Schöller. I am yet to come across sources featuring continuous quotations of insurance rates for Liverpool and Hamburg.

[302] The sources for prices are as per fn. 38.

official trade statistics.[303] The sources of the import data for New York and Liverpool are the same as the sources of the price data previously cited, except for the year 1836 for Liverpool, which comes from *Gore's Liverpool General Advertiser*. For New York, the *Shipping and Commercial List* published convenient monthly statements of the volume of imports by product and origin. In the case of Liverpool, both the *Liverpool Mercury* and the *General Advertiser* included weekly summaries of the volume of imports by product and origin. A monthly series has been assembled by collecting and summing the weekly observations. In both cases, the series represent gross imports, and do not account for re-exports. In the case of New York, this is not such a problem, as most re-exports were most likely domestic in character.[304] As discussed in the previous section, this was not the case for Great Britain, due to high tariffs on non-colonial product. Given that virtually all non-colonial product was re-exported during this period, I exclude imports of coffee and sugar from non-colonial origins from the total import sum to Liverpool. While a portion of colonial imports were also re-exported, it is impossible to gauge whether this came from imports to Liverpool, and whether these re-exports were foreign or domestic in nature.[305] With these considerations in mind, readers should be aware that the inclusion of re-exports may marginally over- or under-value the market potential estimate.

The market potential measure takes the form:

$$MP_{cjt} = \frac{lnY_{cjt}}{ln(1+t_{cjt}+I_{cjt}+T_{cjt})} \text{ [1]},$$

[303] Hamburg, *Tabellarische*. The Hamburg series includes re-exports from Great Britain and other European ports.
[304] National statistics indicate that the percentage of coffee imports retained for consumption in the United States rose from 75 in 1830 to 91 per cent in 1840. Imports of brown sugar retained for consumption in these years were 92 and 91 per cent, respectively. United States, *Commerce and Navigation*.
[305] Imports of colonial brown sugar and coffee averaged 111 and 144 per cent of the quantity retained for consumption over the period, respectively. United Kingdom, *Tables of the revenue*.

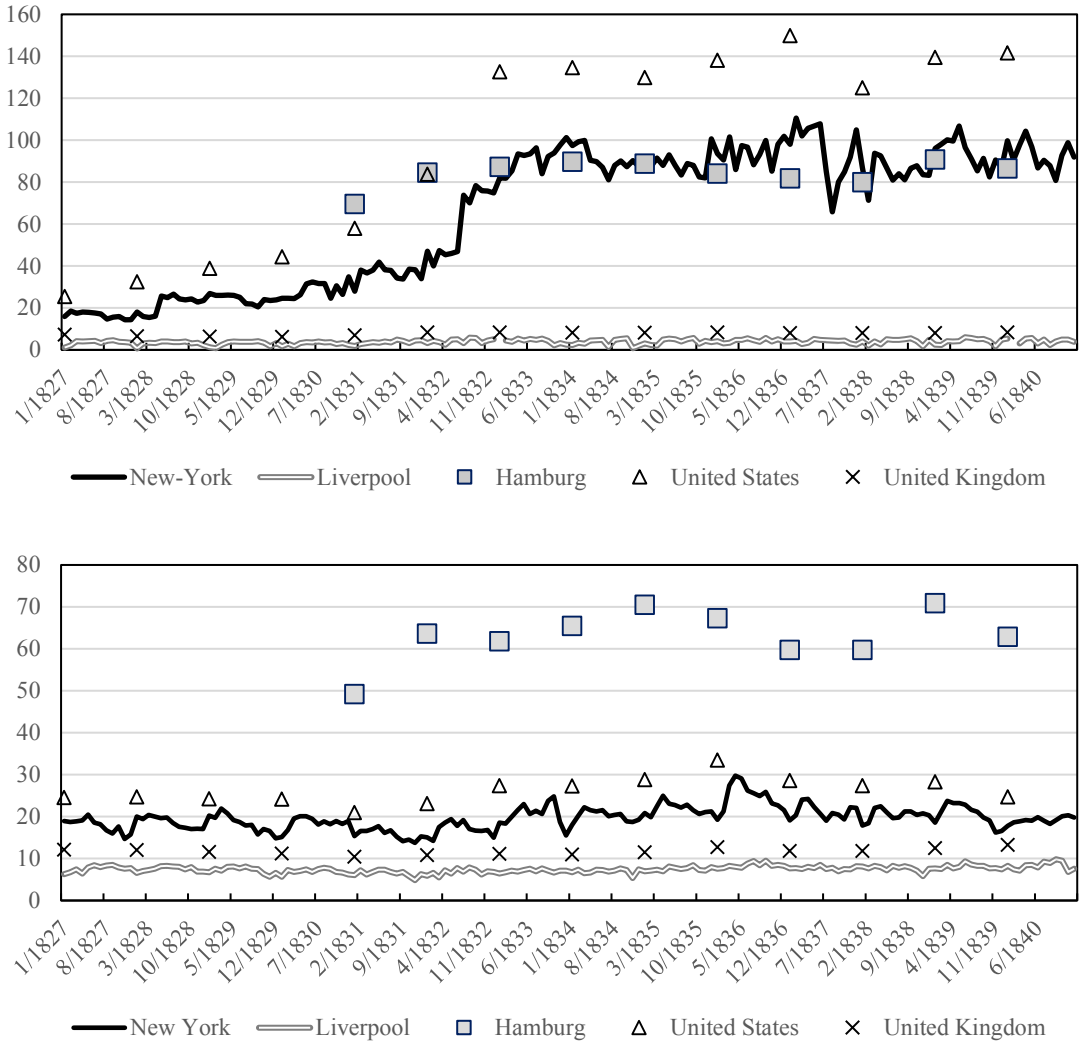


Figure 5.4. *Foreign market potential of Brazilian coffee (above) and sugar (below) in New York, Liverpool, Hamburg, the United States and the United Kingdom*

Notes: Full series p. 394. *Sources*: Imports: New York: *Shipping and Commercial List and New York Price Current*. Liverpool: 1/1827-11/1834, 3/1835-8/1835, 10/1835-12/1835, 1837-1840: *Liverpool Mercury*; 12/1834, 1/1835-2/1835, 9/1835, 1836: *Gore's Liverpool General Advertiser*. Hamburg: Hamburg, *Tabellarische*. United States: United States, *Commerce and Navigation*. United Kingdom: United Kingdom, *Tables*. Freight rates: 'Reconstruction.' Insurance rates: Schöller, 'L'évolution'. Tariffs: United States, *The existing tariff*, pp. 136-137, 156-157; United Kingdom, *Coffee.-Cocoa.-Cheese and butter*; United Kingdom, *Sugar & C.*

where the market potential of commodity c in country j at time t is calculated as the total demand for commodity c in country j at time t (Y_{cjt}), discounted by the previously mentioned trade costs: freight rates (t_{cjt}), insurance rates (I_{cjt}), and import tariffs (T_{cjt}).

Figure 5.4 presents the results for coffee (above) and brown sugar (below) for the three markets, together with estimates for the United States and United Kingdom. The effect of colonial preferences on the British market potential for Brazilian coffee and sugar is clear: the market potential for both commodities in Liverpool and the United Kingdom is negligible when compared to American and Hanseatic levels. Furthermore, the effect of the abolition of American tariffs on the market potential for coffee is evident: in a period of 12 months, spanning abolition in July 1832 to the summer of 1833, market potential doubled. A new equilibrium was subsequently reached, and market potential fluctuated around a constant trend (except for the negative shock associated with the financial crisis of 1837) for the rest of the period. The New York market alone attained market potential levels comparable to Hamburg after the abolition of tariffs. New York, however, only accounted for around 35 per cent of total American imports during the 1830s.[306] Thus, as figure 5.4 demonstrates, total American coffee market potential rose to become the highest in the sample, and most likely the highest in the world. Hamburg remained the leading market for southeastern sugar and American sugar market potential, while being comparable in the late-1820s, was dwarfed by the market potential of coffee after the abolition of the tariff.

THE AMERICAN COFFEE TARIFF AND BRAZILIAN EXPORTS

Quantifying the precise effect of the abolition of the American coffee tariff on Brazilian exports is a difficult task for several reasons. Firstly, as mentioned above, the reduction of the tariff took place over the period of five years, although, judging from the change in consumption trends, the expansion of mass consumption in the United States most likely began after 1830. Secondly, the nature of coffee cultivation in southeastern

[306] Calculated by dividing total imports of the New York series by total national imports taken from United States, *Commerce and Navigation*.

Brazil at the time meant that any exogenous demand shock would generate a lagged supply response of at least three years.[307] Furthermore, the limitations of the monthly export data restrict the pre-treatment starting point of the series to January 1827, leaving little room to estimate pre-trends for the first duty reduction that occurred in 1828. Here I take a first step in estimating the impact of the reduction and abolition of the coffee tariff using standard intervention analysis methodology. The strategy employed involves comparing the pre- and post-trends of exports to the United States with a series of control groups for the 1830 and 1832 tariff changes. If the post-trend of exports to the United States is larger than both the pre-trend and the post-trends of the control groups, then it is evidence of the positive effect of tariff reduction.[308]

To begin with, I undertake a controlled interrupted time series (CITS) analysis of the monthly export data. CITS is an extension of the differences-in-differences (DID) design that, in a panel setting, estimates the effect of a policy intervention or event (treatment) on a treated group relative to an untreated control. CITS differs from DID in the respect that it measures deviations from a pre-treatment (or baseline) trend rather than a pre-treatment mean. In this sense, CITS is more flexible than DID, allowing for the control of time varying confounders, the inclusion of multiple treatments, and the testing of the parallel trends assumption.[309] It is, however, more data intensive, requiring a

[307] Although coffee is a perennial crop with a lifespan of up to 20 years, it yields its first crop three to four years after the seedlings have been planted. Ferreira de Aguiar, *Pequena*; Dean, *Rio Claro*.
[308] This methodology is preferred over a fixed effects panel estimation of trade and tariff elasticities for the simple reason that it exploits the complete export series. The latter would require a full cross-section of ad-valorem equivalent tariffs for coffee and brown sugar over the period 1827-1840, which is currently only available for a handful of countries. By using the dummy approach, I thus cede a certain degree of precision in favour of representativeness.
[309] The parallel trends assumption is tested in CITS by examining the statistical significance of the differences in the intercept and pre-treatment trends between treated and control groups.

greater frequency of pre- and post-treatment observations for both treatment and control groups.[310] Here, I undertake a univariate CITS analysis that takes the form:

$$Y_{it} = \gamma_0 + \beta_1 T_{pre} + \gamma_1 Z_{pre} + \beta_2 ZT_{pre} + \gamma_2 X_{1830/1832} + \beta_3 XT_{1830/1832} +$$

$$\gamma_3 ZX_{1830/1832} + \beta_4 ZXT_{1830/1832} + \gamma_8 D_{1837} + \varepsilon_t \text{ [2]},$$

where Y_t is export volume (in metric tons) to country i in month t, γ_0 the initial intercept (of the control group), T_{pre} the (control) pre-treatment slope, $X_{1830/1832}$ a dummy that captures the (control) level change following the immediate introduction of the treatment, $XT_{1830/1832}$ the difference between the (control) pre- and post-treatment slope, Z_{pre} the difference between the intercepts of the control and treated group prior to treatment, ZT_{pre} the difference between control and treated pre-treatment trends, $ZX_{1830/1832}$ the difference in level change between control and treated following the immediate introduction of the treatment, and $ZXT_{1830/1832}$ the difference between control and treated of the difference in the pre-post trend. D_{1837} is a dummy that takes the value of one during 1837 for the United States, to control for the negative effect of the banking crisis on import demand. The coefficients of interest are β_1 for the pre-trend, γ_1 and β_2 for testing the parallel trends assumption, and the sum of β_1 and β_3 for the calculation of the post-trend. The Z coefficients can be used to calculate the size and statistical significance of the pre- and post-trends for the treated group (the United States). Given the detection of significant levels of serial correlation at both the 12- and 24-month lags, I seasonally adjust the data and estimate an AR1 model (prais) with robust standard errors.[311] I define four control groups: World, which includes 10 countries from Europe,

[310] For examples of applications, see Linden, 'Conducting;' 'Lopez Bernal et al., 'Effect.' For a concise explanation of the difference between CITS and DID, Bernal et al., 'Difference in difference.'

[311] Estimated in STATA using the itsa and actest user-written commands. See Linden, 'Conducting;' 'Comprehensive.' To seasonally adjust the data, I regress the series on a constant and set of monthly

Table 5.3. *Pre- and post-trends of controlled interrupted time series analysis on monthly coffee exports from Rio de Janeiro, in metric tons, 1/1827-12/1840*

	To				
	USA	World	Europe, Non-Imperial	Europe, Imperial	Core
			Treatment: 7/1832		
Pre	2.8	1.1	1.1	1.1	2.8
	(0.5)	(0.7)	(0.7)	(0.3)	(1.2)
Post	11.3	2.3	2.9	0.1	3.9
	(4.1)***	(2.7)***	(3.6)***	(0.1)	(3.1)***
			Treatment: 5/1830		
Pre	1.4	0.7	0.6	1.5	2.6
	(0.1)	(0.2)	(0.2)	(0.2)	(0.5)
Post	14.7	1.7	1.6	1.9	2.9
	(7.0)***	(2.7)***	(2.8)***	(1.2)	(3.2)***
Adj R^2	0.4	0.1	0.2	0.2	0.2
Obs	168	1680	1344	504	840

Notes: *** p< 0.01, ** p<0.05, *p<0.10. *Sources*: same as figure 5.1.

Africa and the Americas; Non-Imperial Europe, which includes those countries that did not possess colonial suppliers of coffee; Imperial Europe, which includes those that did; and Core, which includes the principal consumers of the southeast´s coffee (outside of the United States): Germany, Belgium, Austria, and the United Kingdom.[312] [2] is run separately on the 5/1830 and 7/1832 treatment points, in order to gauge the differential effect of each.

Table 5.3 reports the coefficients of the pre- and post-trends for the United States, and each control group. γ_1 and β_2 (unreported) are not statistically significant in all cases, indicating the validity of the parallel trends assumption. There is a large (and statistically significant) change in the pre- and post-trends of exports to the United States, from three

dummies and add the residuals to the original mean. For a detailed explanation of this technique, see Baum, *Introduction*, pp. 174-178.

[312] The world sample constitutes 96 per cent of total export volume over the whole period, Non-Imperial Europe 39 per cent, Imperial Europe 26 per cent and Core 58 per cent. The estimation is undertaken on the uncorrected data, given that British re-exports were not presented monthly. This might bias downwards the coefficient of the Non-Imperial Europe control group.

to 11 metric tons per month, following the 1832 abolition of the coffee duty. The post-trend is larger than that of any of the control groups. The comparable size of the American pre-trend (although not statistically significant, it is comparable to the Core and larger than the other control pre-trends), however, indicates that the skew towards the United States had begun prior to the abolition of the tariff. This is confirmed by the coefficient of the post-trend following the 1830 reduction of the tariff, which is larger than that of the 1832 post-trend. Prior to the 1830 treatment, exports to the Core countries increased faster than those of the United States. This trend was reversed after the treatment, however, and exports to the American market increased faster than those to any of the control groups. Significantly, the change from pre- to -post trend for the control groups (apart from Imperial Europe in 1832) was positive, suggesting that the reduction and abolition of the American tariff on coffee served to increase the absolute volume of exports across the board.

However, there are two issues that may bias these trend estimates. Firstly, it is possible that unobserved cross-sectional heterogeneity might serve to confound the tariff effect. Furthermore, the monthly series is characterised by a substantial number of zeros, a ubiquitous characteristic of high frequency trade data, which might serve to bias the size of the coefficients. As a robustness check, I run a simple differences-in-differences estimation for the treatment points that takes the form:

$Y_{it} = \alpha + \gamma_1 T_i + \gamma_2 t_i + \gamma_3 (T_i * t_i) + \varepsilon_{jt}$ [3],

where Y_{it} is again the export volume (in metric tons) to country i in month t, T_i is a dummy that takes the value of one for the treatment period (5/1830 to 12/1840; 7/1832 to 12/1840), t_i is a dummy that takes the value of one for the treated country (the United States), $T_i * t_i$ is the differences-in-differences term and ε_{jt} is the error term. I include

Table 5.4. *Differences between treated (USA) and control means of monthly exports from Rio de Janeiro, pre- and post-treatment, Poisson pseudo-maximum likelihood, country and year fixed effects*

	Control			
	World	Europe, Non-Imperial	Europe, Imperial	Core
		Treatment: 7/1832		
Pre	1.7 (10.4)***	1.6 (9.8)***	0.2 (1.2)	-0.6 (-4.3)***
Post	2.7 (21.7)***	2.8 (22.1)***	0.9 (10.5)***	0.5 (6.0)***
		Treatment: 5/1830		
Pre	1.7 (9.5)***	1.7 (9.3)***	-0.5 (-2.9)***	-0.5 (-3.5)***
Post	2.6 (20.9)***	2.6 (21.0)***	0.3 (4.6)***	0.4 (4.8)***
Adj R^2	0.6	0.6	0.4	0.4
Obs	1680	1344	504	840

Notes: *** p< 0.01, ** p<0.05, *p<0.10. *Sources*: Exports: same as Figure 5.1.

both country and year fixed effects. To control for the presence of zeros in the monthly data, I present results using the Poisson pseudo-maximum likelihood (PPML) estimator.[313] γ_1 provides an estimate of the difference of the means between the treated and control groups in the pre-treatment period, while the sum of γ_1 and γ_3 gives the post-treatment difference. These coefficients are displayed in Table 5.4 for the four control groups. Although the results are not directly comparable to those of [2] as they reflect expected means rather than trends, they do support the pre- and post-treatment dynamics shown in Table 5.3. The differences between the treated and control means increased following both treatments, confirming that exports to the United States rose relative to the control groups. What's more, the coefficients on the 1830 treatment show that this dynamic was present before the abolition of the tariff in 1832.

[313] On the performance of PPML relative to OLS in the presence of many zeros, see Santos Silva and Tenreyro, 'Log;' 'Further simulation evidence.' Of the 1680 observation in the 10-country sample, 319, or 5.3 per cent, are zeros. Appendix 5.5 displays the results of [2] run on the truncated series. The inclusion of zeros most notably serves to reduce the estimate of the pre-trend for the 1830 treatment.

The results of the intercept and pre-trend obtained from [2] permit the speculative exercise of calculating counterfactual exports in the absence of the 1830 and 1832 tariff changes. To provide a range of counterfactual estimates, I present two scenarios for each treatment. First, I assume that the shift in American tariff policy only affected exports to the United States. Estimates A (no 1832: the duty continued to be one cent per pound) and C (no 1830: the duty continued to be two cents per pound) in Figure 5.5 are calculated by extrapolating the monthly series of exports to the United States using the intercept and pre-trend coefficients for the 1832 and 1830 treatment points, respectively, as well as the dummy coefficient for 1837, and adding this to the total export series (minus actual exports to the United States). Secondly, I assume that the effect of the American tariff policy shift was dynamic, and so also affected exports to the principal consumers of Brazil's coffee in Europe. Estimates B and C are calculated in the same way but using the intercept and pre-trend for 'Core' and adding this to the counterfactual United States series. The difference between the counterfactual and the original series is interpreted as an estimate of the effect of the treatments, with A and C providing a lower and B and D an upper bound estimate. I estimate that in the absence of the 1830 treatment, the volume of total exports would have been between 29 (estimate B) and 41 (estimate D) per cent lower than the actual total during the period 1830-40. In the case of the 1832 treatment, the figures for 1832-40 are 19 (estimate A) and 28 (estimate C) per cent. In the case of the dynamic ('Core') estimates, almost all the growth that occurred during the 1830s would have disappeared in the absence of the treatments.

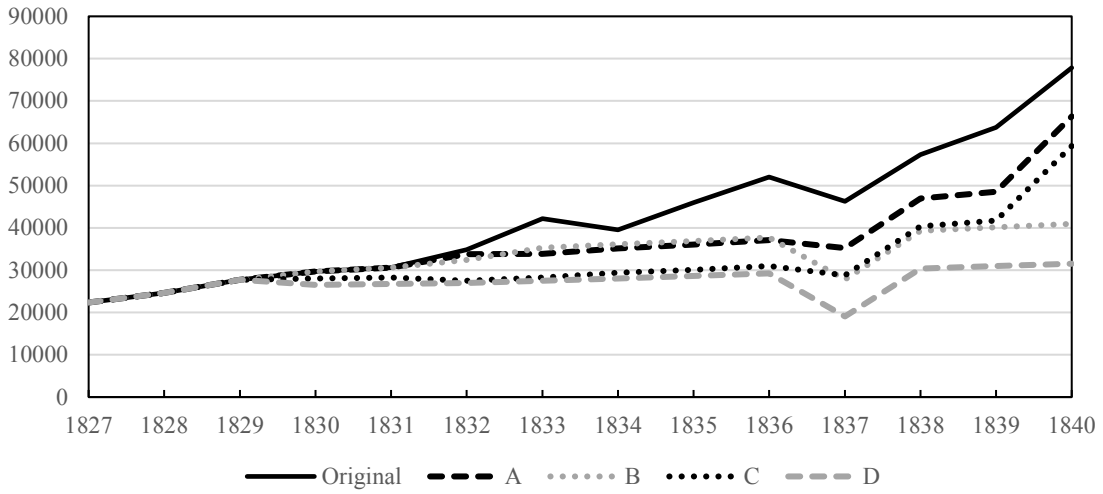


Figure 5.5. *Total exports (in metric tons) of coffee from the port of Rio de Janeiro, original and counterfactual estimates, 1827-1840*

Notes: Full series p. 435. A is no-1832 counterfactual USA plus no counterfactual rest. B is no-1832 counterfactual USA plus 'Core' pre-trend counterfactual rest. C is no-1830 counterfactual USA plus no counterfactual rest. D is no-1830 counterfactual USA plus 'Core' pre-trend counterfactual rest. *Sources*: same as Figure 5.1.

The most important consequence of the expansion of the coffee economy in southeastern Brazil was the increased demand for and supply of African slave labour. During the period under analysis, over half a million African slaves were imported into the southeast of Brazil, many of them destined for the coffee plantations.[314] Over 300 thousand of these slaves were imported after the Brazilian government outlawed the trade in 1831. How might this trade have looked in the absence of American tariff reform? Using estimates of output per slave from Rio de Janeiro in 1827 and the counterfactual estimates shown in figure 4, I calculate the number of slaves required to produce the observed and counterfactual export volumes for the two dynamic 'Core' counterfactuals: no reduction in 1830 and no abolition in 1832. I include two estimates of output per slave: a lower (A; 23.5 *arrobas* or 0.35 metric tons per slave) and upper (B; 40 *arrobas* or 0.59

[314] Eltis, *Economic Growth*, pp. 243-244.

metric tons per slave) bound.[315] Underlying this exercise are two important assumptions: a) that productivity did not rise above 40 *arrobas* per slave and b) that slave mortality was zero during the period 1827-40. In the absence of a major pecuniary incentive to export, such as the expansion of American coffee market potential described above, the former assumption is not completely farfetched. Rates of slave mortality, however, were evidently greater than zero.[316] The violation of the second assumption would serve to increase the slave requirement, biasing downwards the estimates. Thus, the figures shown in Table 5.5 should be interpreted as a lower bound threshold. The estimates show that between 132 and 222 thousand slaves were required to produce the volume of coffee exported during the period 1827-40. The counterfactual estimates suggest that between 78 and 132 thousand less slaves would have been required if the United States had not reduced the tariff in 1830, and between 63 and 105 if the tariff had not been abolished in 1832. These estimates correspond with between 12 and 26 per cent of slaves imported during 1827-40. Would the law of 1831 have been more effective in the absence of the demand shock generated by the shift in American tariff policy? The answer to such a question is difficult, given the central role that slavery played in the Brazilian economy at the time, the absence of any immediate substitute for African slaves, and the increased demand for labour generated by the sugar boom in the northeast during the 1840s. What is clear, however, is the central role that American tariff policy played in the expansion

[315] Corrêa do Lago, *Escravidão*, p. 461, note 12. Corrêa do Lago notes that these estimates most likely include slaves not directly involved in the cultivation of coffee. The author (p. 468, note 38) also cites estimates given in Tschudi, *Viagem*, pp. 39, 46, ranging between 135 and 182 *arrobas* (1.98 and 2.67 metric tons), but these are from the period 1847-54, thus including the rapid increases in productivity achieved through increased economies of scale during the consolidation of the coffee economy in the 1840s. Estimates presented by Klein and Luna for Areias, São Paulo, are actually lower than those for Rio de Janeiro - 0.19 (1825) and 0.8 (1854) metric tons – perhaps unsurprisingly, given that Rio de Janeiro was the epicentre of the initial phase of the nineteenth century coffee boom, and the first to experience concentration and associated productivity enhancements in cultivation. Klein and Luna, *Slavery and the economy*, pp. 60, 65-7, 71.

[316] For a discussion of mortality trends and the life expectancy of slaves in Brazil, see Klein and Luna, *Slavery*, pp. 163-172; Carvalho de Mello, *The Economics of Labor*, pp. 104-125.

Table 5.5. *Estimates of total slave labour requirements (thousands), actual and counterfactual, 1827-40*

Slaves needed:	A	B
Actual	222	132
Counterfactual:		
1830	90	53
1832	117	69
Difference:		
1830	132	78
1832	105	63
% of slave imports:		
1830	26	15
1832	21	12

Notes: A is based on an output per slave figure of 0.35 metric tons. B is based on an output per slave figure of 0.59 metric tons. *Sources*: Output per slave: Corrêa do Lago, *Escravidão*, p. 461, note 12. Actual and counterfactual export volume: figures 5.1 and 5.4.

of both the coffee economy and the contraband slave trade in the southeast during the 1830s.

FIRM-LEVEL DYNAMICS

An additional consequence of the abolition of the American tariff and subsequent export boom was the radical alteration of the composition and behaviour of export firms operating in the port city. Here I present disaggregated data on firm-level exports for three benchmark years including that prior to the reduction of coffee duties in the United States, 1827, three years after the abolition of duties, 1835, and the end of the export series, 1840.[317] The data indicate that, in just over a decade, a handful of firms rose to occupy around half of all coffee shipments. Of these firms, American and German firms rapidly

[317] The sources of these data are the same as the aggregate series presented above. The firm-level data, however, was presented daily, and indicated the destination, the name and nationality of the ship, the name of the captain, *consignatorio*, and the volume exported. The daily data were collected and summed to obtain yearly estimates for each firm for each benchmark. In the case of 1827, the *consignatorio* was not given in the daily listing for exports, so I matched the ship's name and nationality with previous lists of incoming vessels that did include the consigning firm. The data for 1835 and 1840 show that in all cases importing and exporting firms were the same, so this shouldn't bias the assignment of *consignatorios*. The identification of the nationality of the principal *consignatorios* was performed using information provided by the secondary literature on export firms, principally Jarnagin, *Confluence*; Marques, 'Contraband;' Kuniochi, 'Crédito;' Ribeiro, 'Leading.'

eroded British pre-eminence in the export market, while non-American firms increased their participation in the American coffee market.

The export firm played a vital role in the distribution leg of the coffee commodity chain.[318] Once the coffee beans were harvested, the coffee was consigned to a factor (*comissário*/*correspondente*), who was responsible for the intermediate stage of the distribution chain from the interior to port.[319] Before the coming of the railroads, coffee was transported to the port by muleteers (*tropeiros*), where it was entered into factor warehousing, sacked according to commercial standards, and stored until a transaction with an export firm could be brokered.[320] Export firms acted as consignment officers (*consignatorios*), connecting the supply of Brazilian planters with the demand of foreign clientele overseas, occasionally mediated by ship brokers (*corretores de navios*). Both during the rise of the coffee economy in Rio de Janeiro and its *apogee* in São Paulo later in the century, the final stage of the commodity chain was dominated by foreign capital.[321]

Table 5.6 displays descriptive statistics of the principal firms exporting coffee from Rio de Janeiro in 1827, 1835, and 1840. Prior to the initial reduction of the American coffee duty in 1828, the export of coffee was principally a British affair: the top four British firms together accounted for around a third of all exports (Columns B and C). These firms covered the principal export destinations (Column F: the Austrian Empire, Belgium, the British re-export market and the Hanseatic Cities) in Continental

[318] For a model of the Brazilian coffee commodity chain, see Topik and Samper, 'Latin American,' p. 134.
[319] Sweigart, *Coffee factorage*; Taunay, *Historia, Tomo V,* pp. 43-51.
[320] Stein, *Vassouras*, p. 81; Maxwell, Wright and Co., *Commercial Formalities*, p. 79. On transport and *tropeiros* before railways, Schmidt, 'Tropas;' Klein, 'Supply;' Suprinyak, *Tropas*.
[321] Pereira da Silva, 'Predomínio;' Absell and Tena-Junguito, 'Brazilian export economy,' p. 126. Shortly after the fall of the Empire and birth of the Republic in 1889, finance minister Rui Barbosa decried the 'monopoly of the export of our products, exercised solely by foreign houses in Brazil, affiliates of parent companies situated in European and American markets, which exploit the trade of the fruits of our culture at prices dictated by the arbitrariness of uncorrected speculation.' Brazil, *Relatorio*, p. 343.

Table 5.6. *Top five firms exporting coffee from Rio de Janeiro, 1827-1840*

A	B	C	D	E	F	G
Name	Nationality	% of total exports	% USA of firm exports	Principal ship nationality (count)	Principal destination (weight)	% of total exports
			1827			
James Birckhead & Co.	American	11	98	American (25/25)	Baltimore	
Priaulx Tupper & Co.	British	10	0	British (18/18)	Trieste	
Henry Miller & Co.	British	8	0	British (15/19)	Guernsey	42
F. Le Breton & Co.	British	7	0	British (23/25)	Antwerp	
Heyworth Brothers	British	6	0	British (9/13)	Hamburg	
			1835			
James Birckhead & Co.	American	18	78	American (32/32)	New York	
Maxwell Wright & Co.	American	14	95	American (22/25)	New York	
F. Schott	German	13	15	Hamburg (15/30)	Hamburg	65
George Hudson & Co.	British	12	0	British (20/47)	Trieste	
Henry Miller & Co.	British	9	23	British (13/23)	Trieste	
			1840			
George Hudson & Co.	British	13	0	British (22/75)	Trieste	
F. Schott	German	12	8	Danish (24/45)	Trieste	
Maxwell Wright & Co.	American	10	99	American (34/35)	Baltimore	49
Schröder & Co.	British/German	9	43	American (13/27)	Hamburg	
Miller Le Coq & Co.	British	5	13	British (9/18)	Trieste	

Sources: 1/1827-6/1827: *Diario Mercantil*; 7/1827-12/1827, 1835, 1840: *Jornal do Commercio*.

Europe before the rise of the United States in the 1830s. The exception was the American firm James (Diogo) Birckhead and Co., which occupied 11 per cent of total exports, and 80 per cent of the exports to the United States in 1827. Birckhead and Co. was an outlier in the sense that it exported almost five times the volume of its principal American competitors of the time (Maxwell Wright and Co. and Samuel Clapp and Co.) and outdid its British competition in terms of the number of coffee consignments (25, Column E). The firm's early position was driven not by the demand for coffee in the American market, however, but by the early monopolisation of the Baltimore flour trade, which counted among the principal exports from the United States to Brazil.[322] Between independence and the reduction of the coffee duties in 1828, American exports of flour to Brazil averaged around twice the value and 10 times the weight of imports of Brazilian coffee.[323] Thus, Birckhead's ships were obliged to carry hides and sugar as additional ballast on the homeward voyage.[324] After 1828, and with the aid of Birckhead and Co., the aggregate trade balance would shift permanently in favour of Brazil.[325]

By 1835, the top five firms exported 65 per cent of the coffee from the port of Rio de Janeiro. The two principal American firms, Birckhead and Co. and Maxwell Wright and Co., together held 32 per cent of the total, with most of this coffee travelling on American ships to New York or Baltimore. The latter would become the leading exporter of coffee during the consolidation of the trade in the 1840s.[326] The degree of concentration in the top five, however, declined during the late-1830s to around half of all exports. By

[322] Jarnagin, *Confluence*, pp. 121-125. Exports of flour averaged 57 per cent of the value of total exports to Brazil over the period 1822-40. United States, *Commerce and Navigation*.
[323] United States, *Commerce and Navigation*. The weight of flour exports is given in barrels. This has been converted to pounds assuming the weight of 196 lbs. to a barrel, given in Waterston, *Manual*, p. 148.
[324] Jarnagin, *Confluence,* p. 122. See appendix 5.6 for the principal export firms for sugar. Birckhead and Co. also accounted for eight per cent of total exports of sugar from Rio de Janeiro in 1827. American traders would thereafter almost disappear from the sugar trade as they shifted to coffee shipments.
[325] During the period 1821-25, the trade balance was three million dollars in favour of the United States. During the last half of the 1830s, however, this had shifted to 17 million in favour of Brazil. United States, *Commerce and Navigation*.
[326] Ribeiro, 'Leading;' Jarnagin, *Confluence*, Chap. 7.

1840, the leading firms were distributed between American, British and German interests. Apart from the British firm George Hudson and Co., however, all the top firms began to export to American ports in the 1830s (Column D).[327] The share of non-American firms in exports to the United States rose from five per cent in 1827 to 25 per cent in 1840. Much of this increase was due to the emergence of an Anglo-German firm, Schröder and Co., a multinational merchant banking and commission house, which possessed offices in London, Hamburg and, Liverpool, and active participation in the American cotton and Cuban sugar trades to Great Britain and Continental Europe.[328]

All the firms listed here were indirectly involved in the slave trade.[329] Thus, these firms not only facilitated the distribution of coffee from Rio de Janeiro overseas, but also reduced slave labour and credit constraints for planters in the interior. The firms' indirect participation in the slave trade took several forms. In the case of the three most important American firms, Maxwell Wright and Co., James Birckhead and Co, and Forbes Valentin and Co., it involved selling (or chartering) ships to slave traders. During the period spanning the *de jure* abolition of the Brazilian slave trade in 1831 to its *de facto* closure in 1850, American-made vessels transported almost 430 thousand slaves to Brazil, accounting for over half of all slave disembarkations during this period.[330] The above-mentioned firms, two of which played fundamental roles in the expansion of coffee exports to the United States, were identified by the United States' Consul in Rio de

[327] It is not clear from the sources whether Hudson and Co. was a commission house, a ship broker, or both. Frequently, adverts for shipping in 1827 listed 'Hudson & Weguelin' as the *corrector*, and the *Almanach do Rio de Janeiro* of 1827 lists Hudson as one of eight *corretores*. In 1835 and 1840, however, Hudson was listed as a *consignatorio* in the shipping lists. It's possible that George Hudson began as a ship broker and later moved into consigning.

[328] Roberts, *Schroders*, Chap. 2. In the early twentieth century, the firm would play an important role in financing the coffee valorisation plans in the state of São Paulo. Hutchinson, 'Coffee,' p. 530.

[329] With the notable exceptions of Hudson and Schott, virtually all the firms exporting coffee in 1840 appeared as signees on a petition supporting the reinstatement of Manoel Pinto da Fonseca, the leading slave trader of the period, as '*assignante'* in the customs house. *Jornal do Commercio*, Ed. 13, 15 January 1840, p. 2.

[330] Marques, 'Contraband,' p. 665. The classic work on the abolition of the Brazilian slave trade remains Bethell, *Abolition*.

Janeiro as playing a major role in providing the vessels, as well as the flag, required for the expansion of the contraband slave trade.[331] Export firms, particularly the British, also reduced credit constraints for slave traders by loosening maturity terms on bills of exchange related to commodities used in the slave trade, particularly cotton textiles.[332] After 1831, British firms reportedly extended maturity terms from the standard 60 days to up to four years, a practice emulated by non-British firms.[333] Pressure from the British government in the 1840s forced British firms to limit maturity terms to 12 months in 1848, and non-British firms to follow suit in 1851.[334] Furthermore, it is also likely that these firms indirectly extended credit to planters by opening accounts with the *comissários*, crediting the cost of imported goods forwarded to the plantations in the interior as well as for services rendered and debiting the value of coffee purchased for export.[335]

CONCLUDING REMARKS

For sugar producers in the southeast of Brazil facing the international market in the 1830s, times were tough. Given lower fixed costs and labour requirements, barriers to entry were lower for novice (or expanding) coffee producers. With a few exceptions in Continental Europe, tariffs were high, and non-colonial sugar was all but prohibited entry to the most important market for sugar at the time, Great Britain. Coffee, on the other

[331] Marques, 'Contraband,' pp. 669-675; *United States*, Chap. 5; Wright, *Desafio*, pp. 242-245; Topik, *Gunboats*, p. 53. See the discussion between the Consul, George W. Slacum, and the Secretary of State, Daniel Webster, in United States, 'Message,' pp. 10-27. The United States flag provided protection from detention by British patrols. Eltis, 'U. S. Transatlantic slave trade,' p. 373-374.
[332] David Eltis estimated that British manufactured goods constituted around 80 per cent of the trade goods shipped from Rio de Janeiro to ports in Africa during the period 1821-43. Eltis, 'British contribution,' p. 219.
[333] Kuniochi, 'Crédito,' pp. 38-41; Tavares, *Comércio*, pp. 125-134. The source of this information is the 'Alcoforado report' from 1853, written by an informant of the Brazilian government. See Tavares, *Comércio*, pp. 123-125; Marques, 'Contraband,' p. 670 and fn. 19.
[334] Kuniochi, 'Crédito,' pp. 41-45. See *Jornal do Commercio*, Ed. 2, 2 January 1851, p. 3, for signees of the non-British resolution.
[335] Marquese, 'Estados Unidos,' p. 60; Marques, *United States*, p. 108. For a list of the charges of commission services rendered by Maxwell Wright and Co. in 1841, see Maxwell Wright and Co., *Commercial Formalities*, p. 24.

hand, enjoyed duty-free status in one of the most rapidly expanding economies in the world. Market potential mattered for southeastern agricultural producers' investment decisions, and determined what they produced, when they produced it and, once harvested, where they sold it.

While the argument presented in this paper reifies the role of demand-side factors in the rise of coffee in the southeast, it is by no means conflictive with the conventional supply-side explanations. There is no doubt that coffee's relative efficiency as a cash crop determined the direction of the southeast's export specialisation. As I have shown here, however, the timing of this specialisation warrants a demand-side explanation. Together, agricultural efficiency and the expansion of coffee's foreign market potential provide a coherent account of why and when coffee emerged as the southeast's principal export commodity. In a sense, the demand-side approach is a nuanced take on some of the claims that the dependency school were making during the last half of the twentieth century: that peripheral economies were structured by the mechanisms of international capitalism in such a way so that they would supply the raw materials necessary for core capitalist development.[336] However, it wasn't merely agricultural specialisation in the periphery that the institutions of the core countries fostered, but also the direction of that specialisation. In southeastern Brazil during the 1830s, market signals worked in such a way that over time Brazilian producers were incentivised to quench a particular thirst in a particular market at a particular historical juncture. Brazilian producers were by no means passive agents, however, as the subsequent social and political reactions to the expansion of the coffee sector all clearly demonstrate.[337]

[336] Gunder Frank, *Capitalism*; Cardoso and Faletto, *Dependencia*.
[337] Font, *Coffee*; Perissinotto, *Classes dominantes*.

The results of this paper generate further questions regarding the rise of coffee and the decline of sugar in the Brazilian southeast. To begin with, it is not clear whether the decline of sugar exports from the southeast was driven by a substitution effect (geography permitting), whether sugar plantations diverted production from the export to the domestic markets, or whether they simply folded under the pressure of external competition. Furthermore, while it is evident that American tariff reform had a significant effect on the investment decisions of Brazilian planters, the mechanism by which increases in foreign demand translated into a local supply response are yet to be elucidated. Given the nature of the coffee commodity chain elucidated above, one important question is: how did the expansion of American market potential reduce credit constraints for planters? Finally, why did sugar exports from Rio de Janeiro decline roughly during the time that exports from the northeast were expanding? Did northeastern planters possess a geographic or cost advantage over their southeastern counterparts? Or did it have to do with trade costs and the characteristics of the shipping industry?

6

Conclusion

The bittersweet century: the vertiginous rise of coffee in the Brazilian southeast and the elongated decline of northeastern sugar; slave emancipation and the mass consumption of slave-grown coffee and sugar; free trade and the exacerbation of economic dependency. Like all epochs of history, the nineteenth century was one of extremes. For Brazil, it was a time of rapid growth, crisis, incremental state building, revolution, bondage, emancipation, environmental devastation, and agricultural dominance; sweet for some, bitter for most. Its influence still informs the human experience in Brazil, manifesting itself in social, economic, environmental and institutional conditions. For this reason, the nineteenth century, particularly the post-independence period, should be at the forefront of any endeavour to understand the nature of Brazil's long-run economic development.

The contributions of this dissertation to Brazilian economic historiography are threefold. First, it has provided the first systematic study of Brazil's nineteenth century foreign trade statistics. The results suggest that previous interpretations of Brazil's nineteenth century export growth experience, based on an uncritical reading of official statistics, should be revised. While the last quarter of the nineteenth century – the *belle époque* of the export economy according to conventional wisdom - was no doubt the peak of Brazil's export experience, at least in terms of volume, it was by no means the most dynamic. The under-valuation of official statistics, ironically a fact that contemporary Brazilian statisticians were well aware of, has clouded historical treatments of the earlier, post-independence period. The dynamism of export growth in Brazil during this period

was among the highest in the Americas, and it is precisely this period that informs the growth experience of the so-called *belle époque* experience of the first globalisation.

Second, this dissertation has put forward a somewhat unconventional explanation for this dynamism. I have argued that post-independence export growth took the form of supply-side responses to demand-side policy interventions. While the proximate sources of export growth were domestic in nature, the ultimate sources were exogenous. What's more, the exogenous institutional change that served to profoundly alter Brazil's economic landscape was largely driven by factors unrelated to the country's export economy. On the surface, neither British slave emancipation nor American tariff reform were explicitly concerned with the development of the Brazilian export economy. Yet, they constituted changes that had far-reaching consequences for Brazil. British slave emancipation radically altered the supply network of the most important sugar consuming market in the world, and the gradual movement towards free trade opened the market, for the first time, to non-colonial producers. The reduction and abolition of the American tariff on coffee rapidly converted the United States into perhaps the first mass consumer of coffee in world history and, given its inability to cultivate on national territory and lack of tropical colonial possessions, the most dependent on foreign suppliers. During different periods and over differing spans of time, Brazilian producers (or, at least, merchants and commercial intermediaries) benefited enormously from both changes. At the same time, hundreds of thousands of Africans were sacrificed to bring Brazilian coffee and sugar to breakfast tables in North America and Europe.

Finally, this dissertation has placed special emphasis on the timing of growth episodes. Timing is crucial for understanding both the rise of coffee in the southeast and the revival of cane sugar in the northeast. Yet, an explanation of the timing of these episodes is curiously missing from the historiography. Part of the reason for this is an

over-emphasis on supply-side conditions. This is understandable, given that, in order to be effective, national and regional history necessarily confines itself to a narrow geographical and temporal range. One of the main messages of this dissertation is that while supply-side explanations are obviously fundamental for understanding the development of the export economy, they are only one side of the story. Future research should thus not only attempt to expand our knowledge of supply-side conditions, but also reconcile these with events in the world market.

Outside of the Brazilian historiography, this dissertation contributes to general debates on economic dependency and the ramifications of globalisation. The former is a debate that continues to inform scholarship and, in some cases, policymaking in Latin America and the Caribbean.[338] Dependency theory accounts of Brazil attribute its 'backwardness' or 'underdevelopment' (read: lack of industrialisation) to a form of structural conditioning in which Brazil's role as a primary product producing satellite was determined exogenously by the industrialised metropolis.[339] Indeed, this dissertation has shown that institutional shifts in the core bred increased internal specialisation and external dependency in Brazil. Such shifts were linked to the evolution of central components of nineteenth century capitalism: the shift to wage labour, the emergence of cultures of mass consumption, and the growing dependency of the working class on non-alcoholic substances to withstand the exigencies of life during industrialisation. They were also linked to the wholesale expansion of slavery. While orthodox interpretations of dependency theory viewed this process as a zero-sum game, 'the development of underdevelopment,' the reality was much more complex.[340] In fact, the marginal

[338] See the case of the Bolivarian Alliance for the Peoples of Our America: Absell, 'Self-awareness.'
[339] See, for example, Gunder Frank, *Capitalism*, pp. 150-219; Evans, *Dependent Development*, pp. 55-101; Dowbor, 'A formação.'
[340] Gunder Frank, 'Development.'

developmental advances that occurred in Brazil during the nineteenth century were closely linked to the development of the export economy.[341] What's more, alternative pathways of development, such as import substitution industrialisation or endogenous growth based on the expansion of domestic consumption, were largely absent during this period of Brazil's history, due to market imperfections derived from the underdevelopment of capitalistic institutions.[342]

The findings of this dissertation also feed into the literature on the determinants of specialisation during the first globalisation. The factor proportions approach, derived from Ricardo's classic theory of comparative advantage, argues that countries specialise in export activities that use their abundant factor of production. Advances in international trade theory have augmented the neo-classical production-side approach of the factor proportions model with insights from firm-level studies and economic geography. While factor proportions may define the commodity structure of production and trade, geography-specific trade costs, home market effects, and foreign demand define the intensity and direction of trade.[343] The reduction of trade costs may result in commodity- and destination-specific demand shifts, expanding the foreign market potential of exports and driving market integration in terms of commodity price convergence.[344] This dissertation affirms the role of transaction costs in the process of specialisation. During the post-independence decades, exogenous shifts in transaction costs and the composition of the international market translated into local price signals in Brazil that provided differing incentives for producers of different commodities. Thus, factor endowments only go so far in explaining the peripheral pattern of agricultural specialisation during the

[341] Absell and Tena-Junguito, 'Brazilian export economy.'
[342] On this point, see Leff, *Underdevelopment*, Chap. 9.
[343] Romalis, 'Factor proportions;' Davis and Weinstein, 'Market access;' Krugman, 'Scale economies.'
[344] Redding and Venables, 'Geography,' pp. 97-100; Head and Mayer, 'Market potential;' O'Rourke and Williamson, *Globalization*, p. 65.

nineteenth century. The southeast's rapid specialisation in coffee and the northeast's continued specialisation in cane sugar were not only products of an abundant source of land, the quality of which was ideal for the cultivation of these commodities. Specialisation in both regions was driven also by the expansion of foreign market potential, fuelled by the reduction of tariffs and subsequent expansion of demand for Brazilian coffee and sugar.

Although the Brazilian export economy is a heavily researched topic, this dissertation has highlighted areas still in need of further investigation. Given the amount of work undertaken for the period of the first globalisation, it would be useful to shift our attention to the period before 1850. Moreover, it might be instructive to focus on commodity and regional studies, given the splintered nature of the Brazilian export economy during the post-independence period. Research might explore more closely the mechanism underlining the rapid growth of coffee, particularly how the growth of American demand served to reduce credit constraints for planters. Additionally, in the case of Brazilian sugar, there remains the question of why the northeast grew and the southeast declined. Attention should also be placed on other export industries, such as tobacco, cacao, hides and herva mate, which also constituted important areas of the economy but have not been subjected to the same empirical treatment as coffee, sugar, or cotton. While focusing on specific commodities or regions, work should strive to be comparative, on not only a local but also an international scale. Only then will we gain deeper insights into the evolution of Brazil's export economy and the country's role in the global economy during the nineteenth century.

APPENDIX

1. INTRODUCTION

1.1 Country composition of unweighted average price indices in Figure 1.2.

	Coffee	Sugar
Amsterdam	Cheribon, Sumatra, Surinam/Berbice/Demerara, St Domingo, Cuba, Puerto Rico, Brazil, Venezuela.	Surinam, Cuba, Danish West Indies, Essequibo, Brazil, Manilla
Hamburg	Martinique, Jamaica, Surinam, Dutch East Indies, Brazil, Havana, Santiago de Cuba, Puerto Rico, Santo Domingo, Venezuela, Bourbon	Havana, Brazil, Dutch East Indies, Jamaica, Martinique, Surinam, Puerto Rico, St Thomas
Liverpool/London	Jamaica, Demerara, Cuba, St Domingo, Brazil, Dutch East Indies, Ceylon, La Guayra, Costa Rica, Java, Bourbon, Cheribon, Ceylon, Sumatra	Barbados, Jamaica, Demerara, Antigua, St Vincent, Cuba, Brazil, Mauritius, Bengal, Siam, Manilla, Java, St Croix
New York	Java, Sumatra, Venezuela, Brazil, St Domingo, Cuba, Puerto Rico, West Indies	British West Indies, St Croix, New Orleans, Cuba, Puerto Rico, Manilla, Brazil, Calcutta, Martinique
Philadelphia	Brazil, Cuba, Java, St Domingo, West Indies	Havana

2. BRAZILIAN EXPORT GROWTH AND DIVERGENCE IN THE TROPICS DURING THE NINETEENTH CENTURY

2.1. Price accuracy index

The price accuracy index for Brazilian exports takes the form

$$PAI_{it} = \sum_{j=1}^{n} \left(\frac{P_{ij} * Q_{ij}}{P_{mj} * Q_{ij}} \right)$$

where PAI_{it} is the price accuracy index of country *i* at time *t*, P_{ij} the unit value of commodity *j* in country *i* at time *t*, P_{mj} the unit value of commodity *j* in country *m* at time *t*, and Q_{ij} the quantity in metric tons of commodity *j* in country *i* at time *t*. The results are given in the text.

Data for P_{ij} and Q_{ij} come from Brazil, *Anuário Estatístico*, pp. 1374-1378. Data sources for international prices (P_{mj}) are listed as follows:

1821-1846: We have computed a weighted average of the monthly prices from different origins to the United Kingdom and Philadelphia. As weights we use the distribution of each origin in a sample of total quantum exports. Price data for the United Kingdom

comes from Gayer et al., *Microfilmed Supplement*. Data from Philadelphia from Bezanson et al., *Wholesale prices*.

The origin and destination of each price series used in the weighted average and quantities used as weights for each product are as follows:

Coffee: Prices: Cuba, St. Domingo, Brazil Rio 7 and Java to Philadelphia, and Jamaica Ordinary to the United Kingdom. Quantities: exports, Samper and Fernando, 'Appendix,' Tables A12, A13, A14, A15.

Sugar: Prices: Jamaica Brown to the United Kingdom, Cuba Brown and Muscovado to Philadelphia. Quantities: exports, Bulmer-Thomas, *Economic History of the Caribbean*, Table A10; world production, Fraginals, *El ingenio*.

Hides: Prices: Buenos Aires to the United Kingdom, Buenos Aires Ox hides to Philadelphia. We have taken the arithmetic average of the two series.

Cotton: Prices: Guyana Raw (Berbice or Demerara) to the United Kingdom, Middling Uplands from the United States to the United Kingdom, from Hammond, *The cotton industry*, p. 898. Quantities: exports, Bulmer-Thomas, *Economic History of the Caribbean*, Table A10; exports, Hammond, *The cotton industry,* p. 898; world production, Hammond, 'Production.'

Cocoa: Prices: Granada to the United Kingdom, Caracas to Philadelphia, 'Island' (includes Guayaquil, St. Domingo, Caracas and Trinidad) to Philadelphia. Quantities: Clarence-Smith, *Cocoa*, Appendix 2.

1846-1850s: As computed values are not listed in the official British statistics for this period, we have taken the prices of four commodities (sugar, hides, coffee, cotton) from Sauerbeck, 'Prices,' adjusting them for the appropriate trade costs. The transition from the weighted average series to the UK series has been performed as follows:

Coffee: 1846-1850: we have taken the arithmetic average of the weighted average series and Sauerbeck's Rio Good Channel variety, 1851-1853: we use Sauerbeck's series, 1854-1855: we use the arithmetic average of the UK and Sauerbeck series, 1856-1913: we use the UK series.

Sugar: 1846-1850: we take the arithmetic average of the weighted average series and Sauerbeck's British West Indian variety, 1851-1853: we use Sauerbeck's series, 1854-1913: we use the UK series.

Hides: 1846-1853: we use the arithmetic average of the weighted average series and Sauerbeck's River Plate Dry variety, 1854: we use the arithmetic average of the Sauerbeck and UK series, 1855-1913: we use the UK series.

Cotton: 1846-1850: we use the arithmetic average of the weighted average series and Sauerbeck's Middling Uplands variety, 1851-1853: we use Sauerbeck's series, 1854-1856: we use the arithmetic average of the Sauerbeck and UK series, 1857-1913: we use the UK series.

Cocoa: 1850-1855: Cocoa is not included in Sauerbeck's sample, so we extend the weighted average series and take the arithmetic average of this series and the UK series, 1856-1913: we use the UK series. For the period 1850-1853 we have also included the average cocoa price during the period 1847-1851 as found in Poole, *Statistics*, p. 52.

Rubber prices for the period 1850-1853 are taken as the average price for Caoutchouc in 1850. These figures are also taken from Poole, *Statistics*, p. 75.

1854-1913: Imports from Brazil to the United Kingdom, taken from United Kingdom, *Annual statement***.**

The overall price series for each commodity and the figures showing the transition between the different series can be seen in appendices 2.1A.

As mentioned in the text, from these international prices we deduct export duties, freight rates, and insurance costs. The data sources for these trade costs are as follows:

Export duties:

Given the diverse nature of the origins of the international price series for the period 1821-1849, we have deducted an "additional" trade cost - which does not include freight or insurance costs - equivalent to the Brazilian export tax. This additional cost falls in the range of 1 to 7 per cent of the value of exports. For the Imperial period, we have used the effective duty on exports (the ratio between the total quantity of export duties collected and the total value of exports) in an attempt to obviate the problems associated with the application of the official ad valorem rates to the *pauta*. During the Republican period the issue is somewhat more complicated. The Republican Constitution devolved the right to earn export duties to the regional governments. The size of the export duty on a single commodity could thus differ across regions; for example, the export duty on cacao from Bahia in 1913 was 14 per cent while that from Pará was 6 per cent. Where possible, we use the duties applied by the principal exporting regions, as these duties would have fallen heaviest on the values of exports. Thus, it must be kept in mind that the rate used for the calculation of the price accuracy index is most likely under-valued by a number of percentage points.

Cacao: 1821-1869: Brazil, *Finanças*, pp. 14-17; 1870-1871: Brazil, *Estatistica do Commercio Maritimo*, pp. 220-221; 1881-1913: Pará, *Mensagem*, p. 91. The years 1872 to 1880 have been interpolated using the general trend of national duties.

Coffee: 1821-1849: Brazil, *Finanças,* pp. 14-17; 1850-1890: Annex 'Impostos de exportação, 1850-1930' from Abreu and Fernandes, 'Market power,' available from

http://www.economia.puc-rio.br/mpabreu/projeto%20cnpq.html; 1891-1913: São Paulo, *Annuario*, p. 124.

Cotton: 1821-1869: Brazil, *Finanças,* pp. 14-17; 1870-1881: Pernambuco, *Projecto*, Mapa 5; 1881-1886: Rio de Janeiro, *Mappas estatisticos*; 1891-1899: Rio Grande do Norte, *Mensagem*; 1902-1913: Pernambuco, *Mensagem*. The years 1883, 1887 to 1890, 1899 to 1901, 1905 to 1907 have been interpolated using the general trend of national and regional duties.

Hides: 1821-1869: Brazil, *Finanças,* pp. 14-17; 1870-1882: Pernambuco, *Projecto,* Mapa 5; 1884-1888: Rio de Janeiro, *Mappas estatisticos*; 1900-1906: Pará, *Mensagem ... 1911*, pp. 233-234; 1890-1891, 1907-1913: Bahia, *Mensagem*. The years 1883, 1889, 1892 to 1899 have been interpolated using the general trend of national and regional duties.

Rubber: 1850-1869: Brazil, *Finanças,* pp. 14-17; 1870-1871: Brazil, *Estatistica do Commercio Maritimo,* pp. 234-235; 1878-1884: Rio de Janeiro, *Mappas estatisticos*; 1885-1913: Pará, *Mensagem,* p. 91. The years 1875 to 1877, 1883 have been interpolated using the general trend of national duties.

Sugar: 1821-1869: Brazil, *Finanças,* pp. 14-17; 1870-1871: Brazil, *Estatistica do Commercio Maritimo,* pp. 218-219; 1884-1887: Rio de Janeiro, *Mappas estatisticos*; 1870-1882, 1902-1904, 1908-1913: Pernambuco, *Mensagem*. The years 1883, 1888 to

1901, 1905 to 1907 have been interpolated using the general trend of national and regional duties.

Freight rates:

Cacao: We use the freight rates for coffee.

Coffee: 1821-1847: Schöller, 'L'évolution. Rio de Janeiro to Antwerp, 'bulky' freight index, interpolated for the periods 1831-1841 and 1843-1848 to extend backwards Klovland's 1848 figure.

1848-1856: Klovland, 'Repeat Sailings Index.' Rio de Janeiro to the British Channel.

1857-1875, 1877-1878: Harley, 'Coal Exports.' Rio to Britain.

1876: we take the arithmetic mean of monthly rates from Rio de Janeiro to the British Channel as found in the *Retrospectivo Commercial.*

1879-1892: we take the arithmetic mean of monthly freight rates from Rio de Janeiro to London as found in the *Retrospectivo Commercial.*

1893-1897: we extend the series using the East Latin American nominal freight index for grain from Mohammed and Williamson, 'Freight rates.'

1898-1913: we take the arithmetic mean of monthly freight rates from Rio de Janeiro and Santos to London as found in *Wileman's Brazilian Review*.

Cotton: 1821-1849: Harley, 'Ocean Freight Rates.' New Orleans to Liverpool. The period 1821-1824 has been interpolated using the 1820 and 1825 values.

1850-1868: Schöller, 'L'évolution.' Rio de Janeiro to Antwerp, ‘light’ freight index.

1869-1877: we extend the series backwards using the East North American nominal freight index of grain from Mohammed and Williamson, 'Freight rates.'

1878-1897: we extend the series backwards using the North American Gulf Coast cotton nominal freight index of cotton from Mohammed and Williamson, 'Freight rates.'

1885: we cover this year using the East Latin American nominal freight index of grain from Mohammed and Williamson, 'Freight rates.'

1898-1913: we take the arithmetic mean of monthly freight rates from Pernambuco to Liverpool as found in *Wileman's Brazilian Review*.

Hides: 1821-1847: Schöller, 'L'évolution.' Rio de Janeiro to Antwerp, ‘bulky’ freight index, interpolated for the periods 1831-1841 and 1843-1848 to match Klovland's 1848 figure.

1848-1861: Klovland, 'A Repeat Sailings Index.' Rio-Grande to the United Kingdom.

1862-1868: we have extended Klovland's series using Schöller's Rio de Janeiro to Antwerp, ‘bulky’ freight index.

1869: we take the arithmetic mean of 1868 and 1870.

1870-1872: we take the arithmetic mean of the minimum and maximum rates from Rio Grande do Sul to the United Kingdom from Angier, *Fifty year' freights*.

1874, 1876-1892: we take the arithmetic mean of monthly rates from Rio de Janeiro to the British Channel as found in the *Retrospectivo Commercial.* These rates are not explicitly denoted as Hides (Couros) until 1891.

1875: Harley, 'Coal Exports,' coffee, Rio to Britain.

1893-1897: we extend the series using the East Latin American nominal freight index of grain from Mohammed and Williamson, 'Freight rates.'

1898-1900, 1902-1903: we take the arithmetic mean of monthly freight rates from Rio de Janeiro to the British Channel as found in *Wileman's Brazilian Review*.

1901: we take the arithmetic mean of 1900 and 1902.

1904-1913: we extend using the East Latin American nominal freight index of grain from Mohammed and Williamson, 'Freight rates.'

Rubber: We use the freight rates for coffee.

Sugar: 1821-1868: Schöller, 'L'évolution.' Rio de Janeiro to Antwerp, ‘bulky’ freight index, interpolated for the periods 1831-1841 and 1843-1850.

1869-1897: we extend the series backwards using the East Latin American nominal freight index of grain from Mohammed and Williamson, 'Freight rates.'

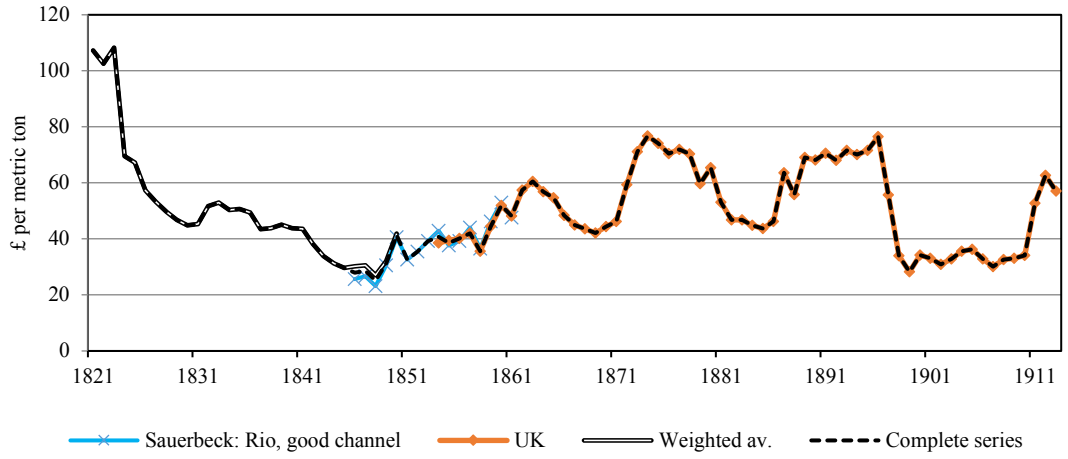
1898-1913: we take the arithmetic mean of monthly freight rates from Pernambuco to Liverpool as found in *Wileman's Brazilian Review*.

Insurance:

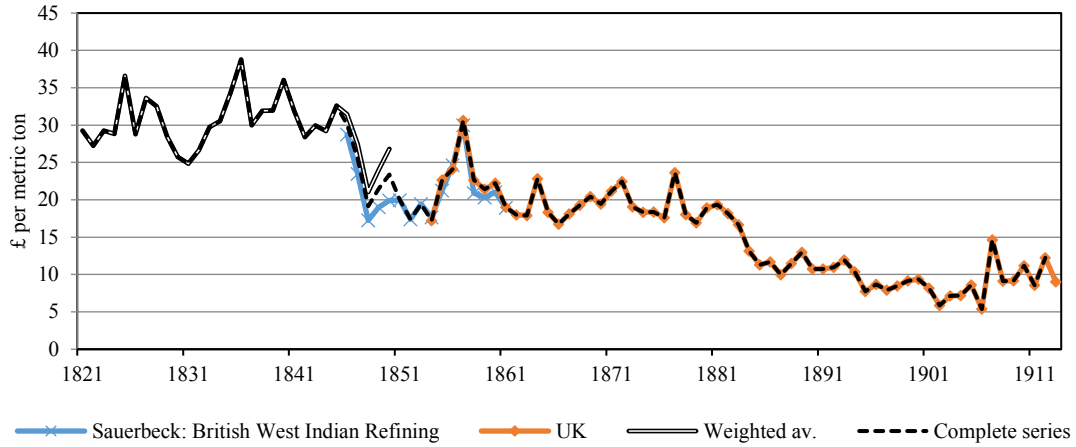
Schöller, 'L'évolution,' Statistical appendix. We use the insurance quotes for Brazil from 1821-1867 and for Rio de la Plata from 1880-1910. The intervening period, 1868-1879, has been interpolated.

2.1A: Sources of complete price series, by commodity, 1821-1913.

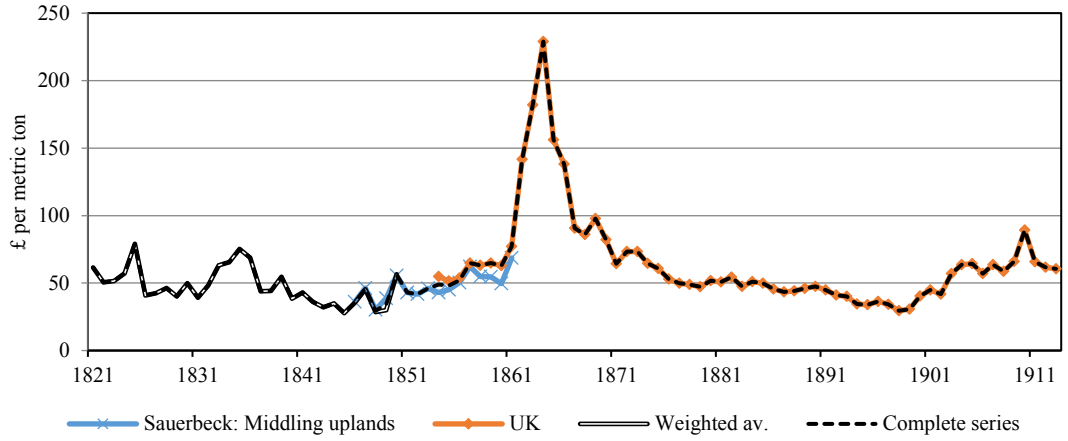
Coffee

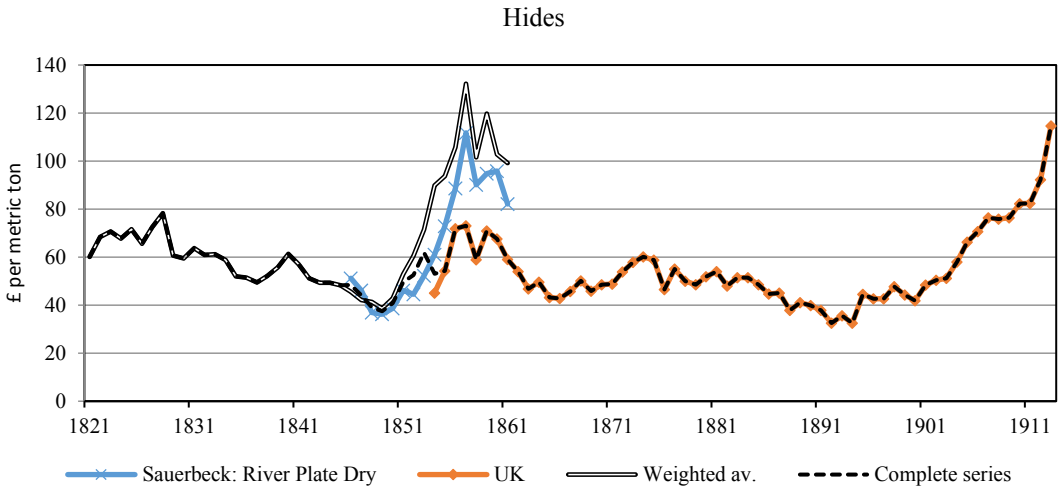


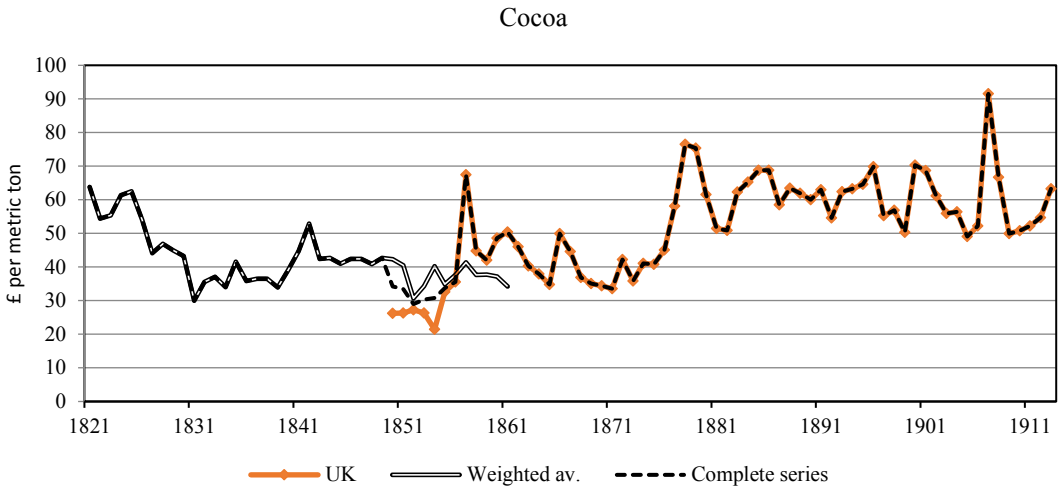
Sugar



Cotton







2.2. Export Price Index

We construct a Fisher index of Brazilian export prices, calculated as the geometric mean of the product of the Paasche and Laspeyres indices:

$$EPI_{it}\sqrt{\frac{\sum P_{jt} * Q_{jt}}{\sum P_{j,1880-82} * Q_{jt}} * \frac{\sum P_{jt} * Q_{j,1880-82}}{\sum P_{j,1880-82} * Q_{j,1880-82}}}$$

where EPI_{it} is the export price index of country *i* at time *t*, P_{jt} is the unit value of commodity *j* at time *t*, and Q_{jt} is the quantity in metric tons of commodity *j* at time *t*. We have used the average of the years 1880-82 as a reference period because it represents the complete cross section of Brazil's export commodity structure. Data for prices in quantities are listed in appendix 2.1.

2.3. Constant market share analysis

The constant market share analysis for exports on the aggregate- and commodity-level takes the form

$$V_{j,t+1} - V_{j,t} = \left(R_{j,t-t+1} * V_{j,t}\right) + [V_{j,t+1} - V_{j,t} - \left(R_{j,t-t+1} * V_{j,t}\right)]$$

where $V_{j,t+1}$ is Brazil's exports of commodity *j* in period *t+1*, $V_{j,t}$ is Brazil's exports of commodity *j* in period *t*, and $R_{j,t-t+1}$ is the percentage increase of total world exports of commodity *j* from period *t* to period *t+1*. For the aggregate-level we use total export values in constant prices and for the commodity-level we use total quantities. Data sources are given in appendix 2.1.

2.4: Commodity composition of exports (%), corrected series, 1821-1913

	Cacao	Coffee	Cotton	Hides	Rubber	Sugar	Other
1821-29	1.4	25.7	13.5	11.6	0.0	30.4	17.4
1830-39	0.8	37.4	9.9	8.0	0.0	31.5	12.3
1840-49	1.4	38.6	4.5	8.7	0.0	32.1	14.7
1850-59	1.1	48.2	6.2	7.7	2.1	21.6	13.2
1860-69	0.8	47.0	17.9	5.7	3.3	11.5	13.8
1870-79	1.0	55.8	10.6	4.7	5.3	12.8	9.9
1880-89	1.7	60.1	4.2	3.2	10.9	11.4	8.5
1890-99	1.6	68.0	1.7	2.8	13.8	3.8	8.3
1900-09	3.0	53.6	2.4	4.1	26.5	1.2	9.3
1912-13	2.4	61.0	2.2	5.9	19.8	0.1	8.6

4. BRITISH SLAVE EMANCIPATION AND THE DEMAND FOR BRAZILIAN SUGAR

4.1A. Weights and measures

An important aspect of the construction of the new database is the homogenisation of original weights and measures. The listings were given in a variety of different measures, several of which (e.g. frazils and serons) were unique to their origins. To convert these measures to metric tons, I rely principally on William Waterston's *Manual of Commerce* published in 1840, which contains a listing of the hundredweight equivalent of the principal measures imported into England.[345] Fortunately, these equivalencies cover the most-traded measures, largely standardised for the purposes of import taxation. In other cases, I was forced to rely on assumptions and anecdotal evidence.

Liverpool conversion measures, in hundredweights (0.05 metric tons):

	Bdl (bundle)	Bg (bag)	Bl (bale)	Brl (barrel)	Bsk (basket)	Bx (box)	Cases	Ck (cask)	frazil
Coffee	6	1.375	2.25	1.25	-	6	6	6	0.26
Sugar	-	1.25	-	7	1.25	4.4	14.5	8	-

	H (hogshead)	Keg	Mat	Pch (puncheon)	Pkt (packet)	Robin	Tc (tierce)	Seron
Coffee	10	1.25	1.125	1.25	6	1.125	6	2.25
Sugar	14.5	7	1.125	7	4.4	1.125	8	-

New York conversion measures, in hundredweight (0.05 metric tons)

	Tierce/Cask	Barrel	Bag	Hhd (Hogshead)	Box
Coffee	6	1.25	1	-	-
Sugar	8	7	1.25	14.5	4.4

[345] Waterston, *Manual*, pp. 147-148.

4.1B. Representativeness of Liverpool sugar and coffee series

Liverpool received on average around 17 per cent of the United Kingdom's imports of sugar over the period 1827-1853.[346] While this is by no means a marginal share, it raises questions regarding the representativeness of the series. This can be ascertained by comparison of the new series for Liverpool with the official aggregate series for the United Kingdom. Figure 4.1A shows the annual total of imports in thousands of metric tons for both series. With a few minor exceptions, the aggregated Liverpool series follows the overall trend of the official series. Both show similar tendencies during the key periods of intervention: stagnation following *de jure* West Indies emancipation in 1834, decline following *de facto* emancipation (the end of apprenticeship) in 1838, and growth and fluctuation following the passage of the Sugar Act of 1846.

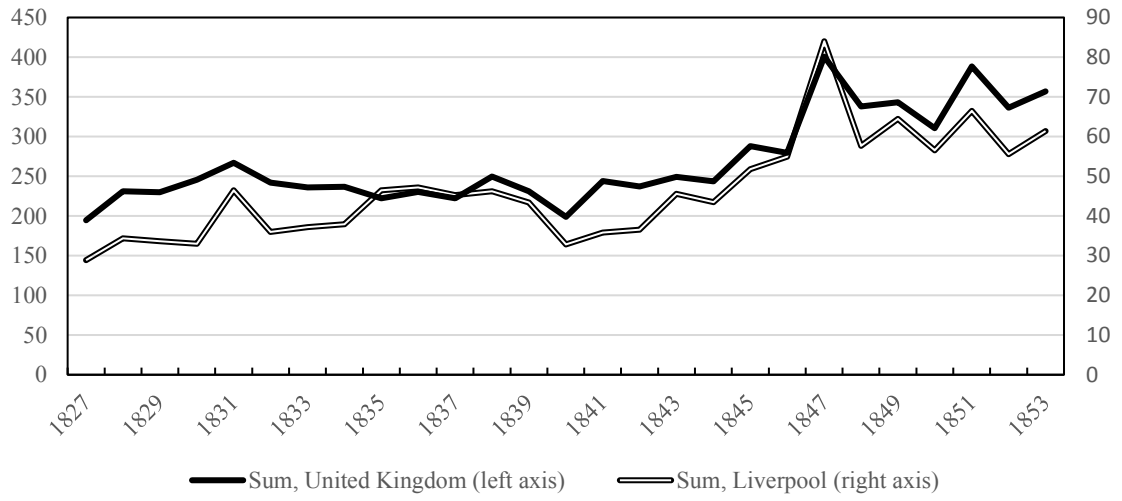


Figure 4.1A. *Total imports of sugar to the United Kingdom (left axis) and Liverpool (right axis) in thousands of metric tons, 1827 to 1853*

Sources: United Kingdom: *Tables*. Liverpool: *Liverpool Mercury*; *Gore's Liverpool General Advertiser*.

[346] With the minimum being 13 per cent in 1830 and the maximum being 21 per cent in 1847. Calculated by dividing the total quantity of Liverpool imports by the annual quantity of national imports given in United Kingdom, *Tables*.

While aggregated tendencies are similar, it is possible that the geographical distribution of Liverpool's imports differed from that of the national trend. Any changes in the shares of each country or region in Liverpool's total imports should reflect the tendencies observed on the national level. Table 4.1A displays the averages of the shares of four groupings of countries (the British West Indies and South American colonies, the British East Indies and Indian colonies, Brazil, and all other origins) during the periods before, after, and between the key interventions of interest for both the annual Liverpool and United Kingdom series. While the Liverpool series overstates the share in total imports of Brazil and understates that of the British West indies when compared to the national series, the trend is similar. The story is the same when each grouping is disaggregated to the country-level. Thus, for the purposes of this paper, Liverpool is taken to be representative of the overall British trend.

Table 4.1A. *Average shares (%) of total sugar imports in Liverpool and the United Kingdom, 1827-1853*

	Liverpool				United Kingdom			
	BWI	BI	Brazil	Rest	BWI	BI	Brazil	Rest
1827-33	87	7	5	1	81	12	3	3
1834-37	75	16	6	3	78	16	2	4
1838-45	45	35	13	6	54	31	5	9
1846-53	34	36	15	15	41	35	7	15

Notes: BWI is the British West Indies and British Guyana; BI is the sum of British India and the British East Indies. Sum might not equal 100 due to rounding. *Sources*: same as Figure 4.1A.

The series of coffee imports to Liverpool is less representative. As shown in figure 4.1B, the trends of the Liverpool and national series diverge considerably after 1842 (the effect, presumably, of tariff reform). The increase during the early-1840s is exaggerated in the case of the Liverpool series, while the timing of the decline afterwards is considerably earlier than that of the national series. The results of the multiple-group itsa

and counterfactual market share calculations will reflect these characteristics of the Liverpool series.

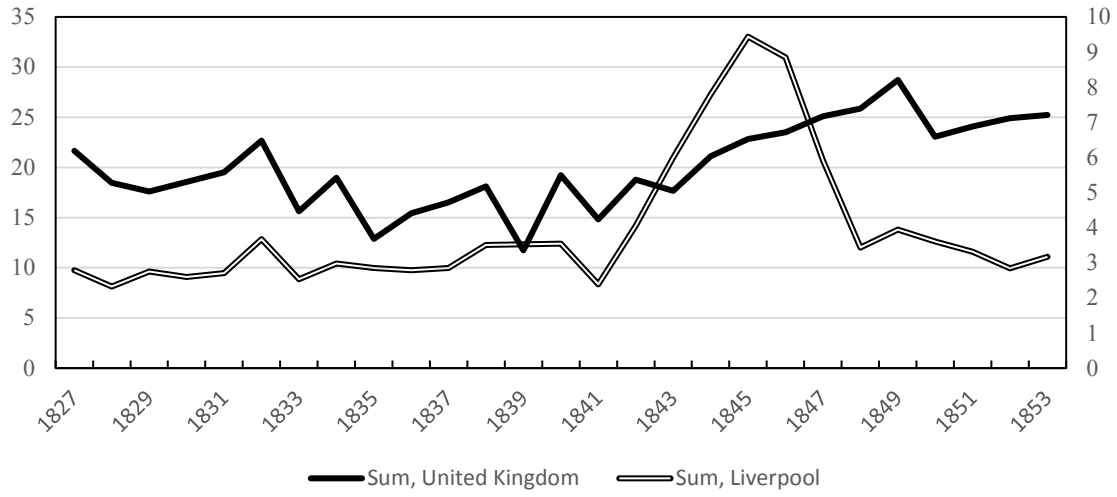


Figure 4.1B. *Total imports of coffee to the United Kingdom (left axis) and Liverpool (right axis) in thousands of metric tons, 1827 to 1853*

Sources: United Kingdom: *Tables*. Liverpool: *Liverpool Mercury*; *Gore's Liverpool General Advertiser*.

The same is true for market share trends. The Liverpool series over-represents the British West Indies share of coffee and under-represents the presence of British India, East Indies. Furthermore, it exaggerates the temporary post-tariff reform increase of non-colonial imports of coffee (Brazil included). The consequence of this is that market share gains for Brazil calculated in the text may be overestimated. In any case, the bias present in the Liverpool coffee series does not detract from the principal conclusion of the paper: that the United Kingdom was a marginal market for Brazilian coffee, and thus the emancipation hypothesis cannot explain the rise of south-eastern coffee.

Table 4.1B. *Average shares (%) of total coffee imports in Liverpool and the United Kingdom, 1827-1853*

	Liverpool				United Kingdom			
	BWI	BI	Brazil	Rest	BWI	BI	Brazil	Rest
1827-33	91	3	2	4	61	16	12	13
1834-37	80	5	6	10	53	24	15	11
1838-45	32	18	10	41	35	39	13	19
1846-53	22	12	18	47	9	59	10	22

Notes: BWI is the British West Indies and British Guyana; BI is the sum of British India and the British East Indies. Sum might not equal 100 due to rounding. *Sources*: same as Figure 4.1C.

4.1C. The representativeness of the New York coffee and sugar series

Comparing the coffee import series to New York with that of the national sum (Figure 4.1C), it is evident that the New York series is largely representative of national trends. Although market share levels are shown to be different (Table 4.1C, New York under-represents Brazil and over-represents Haiti), the tendency of the changes in market shares over the period is similar. Like the sugar series for Liverpool, the coffee series for New York is thus taken to be representative of the overall American trend.

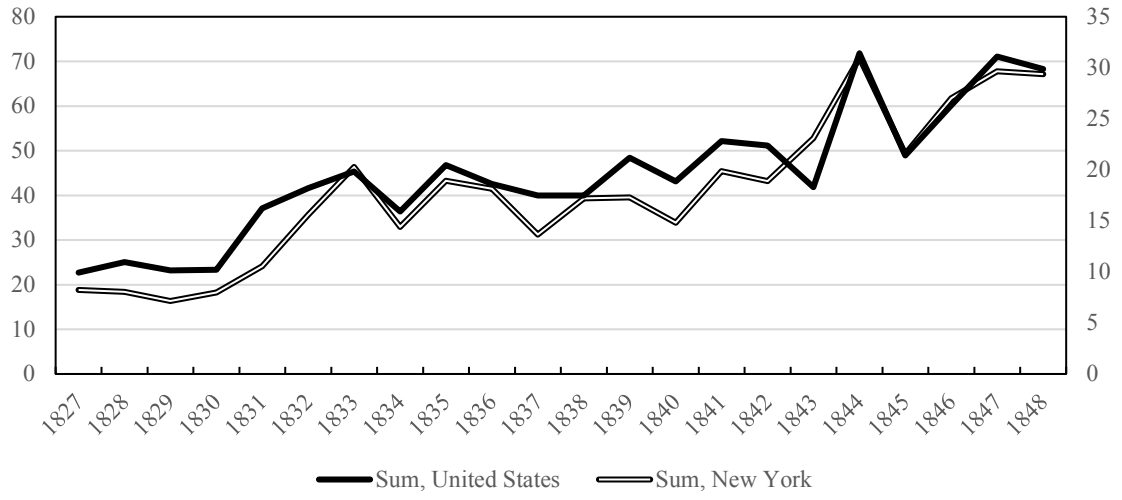


Figure 4.1C. *Total imports of coffee to the United States (left axis) and New York (right axis) in thousands of metric tons, 1827 to 1848*

Sources: New York: *Shipping and Commercial List and New York Price Current*; United States: *Commerce and Navigation*.

Table 4.1C. *Average shares (%) of total coffee imports in New York and the United States, 1827-1853*

	New York				United States			
	SWI	HA	Brazil	Rest	SWI	HA	Brazil	Rest
1827-30	23	38	20	19	39	26	22	13
1830-35	19	24	29	28	38	17	29	16
1835-40	9	16	42	32	30	12	42	16
1840-48	3	13	48	36	11	11	61	17

Notes: SWI is the Spanish West Indies; HA is Haiti. Sum might not equal 100 due to rounding. *Sources*: same as Figure 4.1D.

The case of sugar is different. As shown in figure 4.1D, the New York series diverges from the national series during the period 1837 to 1845. The national series experience considerable fluctuation following the crisis of 1837, while that of New York exhibits a smoother tendency. The New York series also under-represents the shares of the Spanish West Indies (Table 4.1D), due to the inclusion of domestic cane imports from New Orleans. When adjusted for imports of domestic product, however, market shares are comparable to national trends.

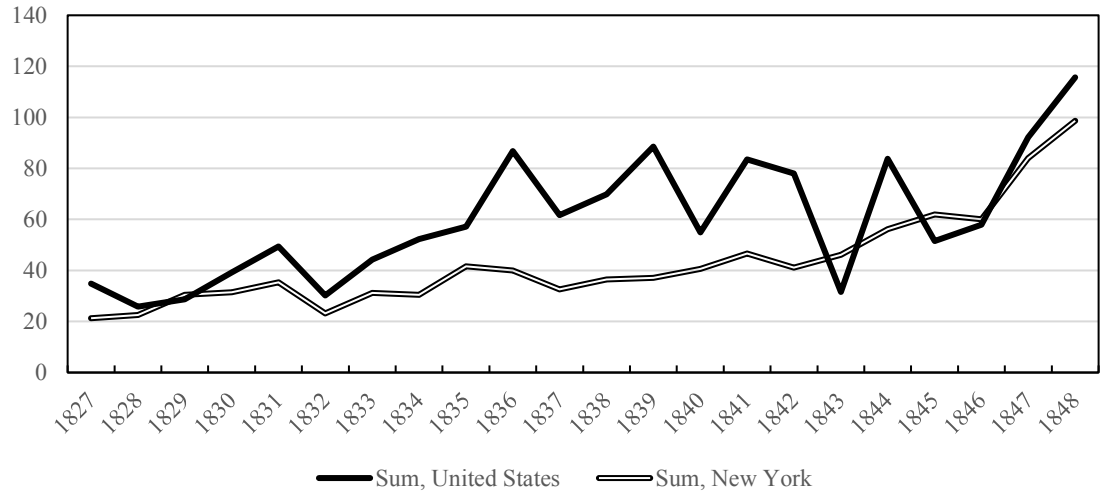


Figure 4.1D. *Total imports of sugar to the United States (unrefined) and New York, in thousands of metric tons, 1827 to 1848*

Sources: same as Figure 4.1D.

Table 4.1D. *Average shares (%) of total sugar imports in New York and the United States, 1827-1853*

	New York				United States			
	SWI	DWI	Brazil	Rest	SWI	DWI	Brazil	Rest
1827-30	23	20	5	53	61	23	8	8
1830-35	32	17	5	45	71	16	6	8
1835-40	32	15	4	49	70	10	7	14
1840-48	42	5	1	51	84	5	4	7

Notes: SWI is the Spanish West Indies; DWI is Danish West Indies (principally St. Croix). Sum might not equal 100 due to rounding. *Sources*: same as Figure 4.1D.

4.2. Results of differences-in-differences estimation on annual data with country fixed effects

	1834	1838	1846	1854
		Treated: United Kingdom		
DiD	282,754.4	343,156.2	410,228.1	378,107.8
	(3.46)**	(5.33)***	(4.80)**	(4.09)**
Constant	134,611.8	125,182	132,453.7	160,411.8
	(2.60)*	(3.61)**	(4.40)**	(10.58)***
R^2	0.39	0.49	0.60	0.37
		Treated: United States		
DiD	-42,856.6	-88,224	-75,057.4	-55,373.9
	(-0.30)	(-0.63)	(-0.45)	(-0.35)
Constant	110,836.7	112,627	129,294.3	159,997.8
	(1.24)	(1.48)	(2.22)	(6.19)***
R^2	0.05	0.10	0.13	0.08
		Treated: Hamburg		
DiD	-390,471.3	-316,298.2	-381,697.5	-381,589.1
	(-5.29)***	(-3.30)**	(-3.58)**	(-4.09)**
Constant	142,477	124,400.4	132,267.9	160,415.1
	(3.05)**	(2.40)**	(3.53)**	(10.48)***
R^2	0.01	0.03	0.14	0.14
		Treated: France		
DiD	-1,243.4	-965.5	20,717	51,196.4
	(-0.01)	(-0.01)	(0.13)	(0.33)
Constant	114,057.1	115,222.8	129,648	159,998.9
	(1.56)	(1.62)	(2.28)	(6.25)***
R^2	0.02	0.04	0.07	0.05
Obs.		128		

5. THE RISE OF COFFEE IN THE BRAZILIAN SOUTHEAST

5.1. Weights and measures

As with the case of the Liverpool and New York imports series discussed in appendix 4.1, an important issue regarding the comparability of the Brazilian data is the conversion of original weights and measurements. The volume of coffee and sugar was listed in units of bags (*saccos*) and boxes (*caixas*), respectively, standard units of measurement at the time that seemingly suffered little variation.[347] However, coffee was also given in barrels (*barritas*), boxes (*caixas* or *caixotes*), and bales (*feixes*), while sugar was listed in bags, barrels, bales, and tins or cans (*latas*). In some instances, several listings provided the *arroba* equivalent of a measure.[348] In other instances, assumptions had to be made. The weights given by Waterston have again been adopted for those measurements not found in Brazilian sources.[349] All weights have then been converted to metric tons as follows.

Rio de Janeiro, in arrobas (14.69 kg, 0.015 metric tons):

	Sacca	Barrita	Caixa	Feixe/Feixo/Fecho	Lata
Coffee	5	3.5	6	2	-
Sugar	5.3	7	50	22.5	5.3

[347] As the commercial guide to Rio de Janeiro by American trading firm Maxwell, Wright & Co. observed with respect to coffee: "It is purchased from the planters by a class of traders, who pack it in bags containing, without variation, five arrobes, or one hundred and sixty pounds Portuguese, and by whom it is sold to the shippers. Full confidence is placed in the weight, as frauds have scarce ever been detected; where however, any doubt may exist, some bags are reweighed upon delivery." The same source observed that sugar was packed in boxes "…containing from 1200 to 2000 pounds." Maxwell, Wright & Co., *Commercial Formalities*, pp. 79, 88.
[348] See, for instance, *Jornal do Commercio* 1832, eds. 5 and 71, in the cases of Gothenburg and Harlingen.
[349] Waterston, *Manual*, pp. 147-148

Interpolation technique

As mentioned in the text, the monthly series of exports is missing several observations, specifically: 6/1828, 11/1829-7/1830, 4/1831-12/1831, 4/1832-5/1832. In order to interpolate these values, I have applied a multiplicative seasonal factor by regressing the natural log of each broken country series on a set of month dummies, with December as the base. This yields a set of monthly effects (relative to December) that can be applied to the existing data in each broken year to fill in the blanks: $v_t{}^* = v_i \pm (v_i * \gamma_t)$, where $v_t{}^*$ is the interpolated volume at month *t*, v_i is the baseline observation (*i* being December for 1828, 1830 and 1832, September or October for 1829, and January for 1831), and γ_t is the multiplicative factor for month *t*. In three cases for each commodity (coffee: 'Italy' 1831, Austria 1831, Sweden 1830; sugar: Austria, Belgium and Chile 1831), a baseline observation for that year is missing. In these cases, I resort to taking the arithmetic average of previous and following year observations for a single month (coffee: December 1830/1832 for Austria and 'Italy,' February 1829/1831 for Sweden; sugar: November 1830/1832 for Austria, December 1830/1832 for Belgium, August 1830/1832 for Chile) and applying the seasonal factor to this figure for the remaining missing months. The reliability of this approach relies on two assumptions: 1) that all countries traded in the missing months, and 2) that trade in these months followed the seasonal trend indicated by the dummies. Violation of either of these assumptions might serve to over- (if countries didn't trade in these months) or under- (if they did trade but the volume was higher than the seasonal effects) inflate the interpolation. This, of course, will affect the pre- and post-trends of the treatments estimated in section three of the paper and, subsequently, the counterfactual estimates. Luckily, for the case of coffee, I was able to recover the total volume of exports for the missing months. When compared to the sums of the individual interpolated country series, it is evident that the above assumptions

were violated in most months (the sum of interpolated series is higher in 1830 and lower in 1831 than the actual total). To correct this bias, I take the distribution of the interpolated series (that is, the interpolated volume exported to each country over the sum of the interpolated series) and apply it to the actual total. This yields a set of corrected interpolations that, when summed, equal the actual total volume exported. In the case, of sugar, I have recovered total volumes only for the months 1/1830 to 7/1830 and 5/1832. For these months, I follow the same approach. For the remained missing months, I simply take the sum of the interpolations.

The seasonal factors (relative to December) for each country are as follows:

Coffee																
	USA	BEL	DEN	FRA	GER	ITA	AUS	RIO	CHI	NET	POR	SWE	UK	SPA	AFR	OTH
Jan.	-0.23	0.14	0.00	-1.19	-0.57	-1.64	-0.65	0.44	-1.51	0.00	-0.29	0.12	0.21	0.00	-1.19	1.60
Feb.	-0.15	0.33	-2.08	-0.62	-0.55	-1.75	-0.71	0.09	-1.12	1.26	0.41	0.37	0.08	-4.84	-1.63	0.11
Mar.	-0.28	0.01	0.00	-0.94	-0.24	-1.63	-1.04	-0.52	-1.20	1.78	0.59	-0.05	-0.45	0.00	-0.38	-2.12
Apr.	-0.30	0.32	0.00	-2.10	-0.39	-0.86	-0.45	1.36	1.75	-0.04	0.18	-1.62	-0.88	-2.95	0.23	-0.60
May	-0.39	0.88	0.00	-1.12	-0.45	-0.99	-1.22	0.66	0.00	0.38	0.31	-0.45	-0.61	0.00	-0.20	0.75
Jun.	-0.36	0.30	0.00	-0.51	-0.08	-0.18	-0.46	-0.03	-1.48	2.53	0.78	-0.61	-0.94	0.00	0.77	-1.57
Jul.	-0.22	0.60	0.00	-0.57	-0.59	-1.02	-0.33	0.36	0.00	1.56	0.83	-0.40	-0.52	0.00	-1.20	0.27
Aug.	0.02	0.91	-0.34	-0.60	-0.31	-0.49	0.10	0.81	-2.30	2.09	0.76	-0.54	-0.23	0.00	-0.87	1.41
Sep.	-0.05	1.13	0.27	-0.57	-0.03	-0.58	0.20	0.62	-1.10	1.20	0.08	-1.13	-0.26	-1.27	-2.02	-0.24
Oct.	0.39	0.78	0.00	-0.50	-0.35	-0.79	-0.02	0.42	0.75	1.70	0.45	-0.54	-0.29	0.00	-1.68	0.14
Nov.	0.24	0.42	0.00	-0.49	-0.56	-0.82	0.39	-0.12	-1.29	-0.42	0.29	-0.44	0.07	0.00	-1.20	0.88
Sugar																
	USA	BEL	DEN	FRA	GER	ITA	AUS	RIO	CHI	NET	POR	SWE	UK	SPA	AFR	OTH
Jan.	1.03	0.48	0.00	3.92	0.42	-0.26	-0.36	-0.14	-2.29	0.00	1.12	1.44	-0.32	0.00	-0.77	-0.37
Feb.	-0.25	-0.70	1.74	1.58	1.42	0.28	-0.81	-0.21	0.09	3.92	0.74	1.75	-0.80	0.84	-0.02	1.35
Mar.	-1.33	1.04	0.00	1.99	1.29	-0.12	-1.47	-1.00	0.19	2.10	1.09	1.44	-0.53	0.00	-0.28	2.58
Apr.	-0.21	0.09	0.00	0.68	1.32	0.09	-1.05	-0.65	1.05	3.63	0.89	0.96	-0.92	-0.59	-0.64	1.14
May	0.30	0.23	0.00	2.58	1.96	0.25	-0.29	0.04	0.36	3.46	0.85	1.00	-0.79	1.23	-0.64	0.39
Jun.	-1.13	-0.65	0.00	1.82	1.60	0.16	-0.62	-0.25	-0.88	0.00	0.76	1.26	-1.09	0.00	-0.32	1.13
Jul.	-1.62	1.23	0.00	0.50	1.39	-0.69	-1.79	-0.27	1.90	4.16	1.20	1.36	-1.76	0.00	-0.70	-0.91
Aug.	-1.62	-1.57	1.02	2.48	1.24	-0.88	-0.93	-0.75	-0.38	4.82	1.03	0.88	-1.21	0.00	0.06	-0.30
Sep.	-2.83	-0.13	0.00	3.47	0.04	0.20	-1.39	-0.35	0.90	2.18	0.20	1.50	-1.41	1.77	-0.34	-2.35
Oct.	-1.66	0.22	0.00	1.18	1.33	0.05	-0.35	-0.15	-0.46	3.99	0.97	-0.16	-0.51	1.06	-0.85	-0.55
Nov.	-2.11	0.55	0.00	1.74	0.82	0.08	-0.42	-0.21	-2.57	1.47	0.59	0.70	-0.66	0.00	-0.69	-1.70

Note: negative values greater than one were treated as zeros in the database.

5.2. Corrections for British re-exports

As mentioned in the text, the geographical distribution of the original Brazilian series is distorted by the presence of British re-exports. An examination of the data on the distribution of British re-exports provides insight into how these might be redistributed across the sample. Table 5.2A displays the average shares of the main destinations of southeastern exports (excepting Austria) in total British re-exports of foreign (non-colonial) coffee and sugar from 1827 to 1840. The estimate for the United Kingdom is the average share retained for consumption of total foreign coffee and sugar imports. Virtually all non-colonial produce imported was promptly re-exported. Re-exports were principally shipped to non-imperial Europe, apart from Holland after 1830, which possessed a notable share of both coffee and sugar re-exports. The main destinations were Belgium, 'Germany' (most likely the Hanseatic provinces, the principal destination being Hamburg), 'Italy' (mainly Genova) and Holland for sugar. The shares of these markets in total southeastern coffee and sugar exports were undoubtedly higher than those gleaned from the original series. To correct the bias in the geographical distribution of the series, I take the portion of foreign exports to the United Kingdom not retained for consumption and distribute it across the sample according to the destination shares of British re-exports. This is then added to the Brazilian series. As Table 5.2A indicates, Holland and Belgium are aggregated as the United Netherlands until 1830. I derive a separate series for each by applying the share of British re-exports to Antwerp (the principal Belgian port) to the total United Netherlands figure. British data on re-exports to the Austrian Empire did not exist at the time and re-exports probably arrived from other European ports, which might bias the geographical distribution of the Continental European countries included in the sample.[350] Figure 5.2 and the results of the differences-in-

[350] MacGregor, *Commercial Statistics*, p. 22.

differences estimation, using the corrected series of export shares, should be interpreted with these caveats in mind.

Table 5.2A. Average percentage share of British re-exports of foreign coffee and raw sugar, 1827-1840

	Coffee	Raw Sugar
	Europe	
Germany	14.7	10.1
Prussia	2.9	10.6
Belgium[a]	32.3	26.8
Italy	10.3	12.3
Portugal	0.1	0.3
	Imperial Europe	
United Netherlands[a]	36.3	29.7
Holland[a]	10.4	11.2
Spain	0.0	0.8
United Kingdom	0.2	0.1
Denmark	2.8	1.8
Sweden	1.1	1.5
France	0.7	0.8
	Americas	
United States	0.6	0.4
Rio de la Plata	0.0	0.0
Chile	0.0	0.0

Notes: [a] United Netherlands aggregates Belgium and Holland until 1830. 1832 and 1833 include total re-exports of coffee and raw sugar, thus include product from the British colonies. *Sources*: Imports and retained consumption: Sugar: United Kingdom, *Sugar*; Coffee: United Kingdom, *Chicory*. Geographical distribution of re-exports: 1827-1831: United Kingdom, *Sugar. Accounts of...*; United Kingdom, *Coffee*. 1832-1833: United Kingdom, *Tables*.

5.3. Port composition of sample of export destinations

Note: Port names maintain spellings as they appear in primary sources.

Europe	
Hanse Cities	Altona, Bremen, Flensburg, Hamburg, Tonningen
Belgium	Antwerp, Ostende
"Italy"	Milazzo, Genova, Livorno, Palermo, Sicilia, Napoles
Austrian Empire	Veneza, Trieste, Vianna
Portugal	Açores, Madeira, Terceira, S. Miguel, Fayal, Lisboa, Porto, Setubal
Imperial Europe	
Netherlands	Amsterdam, Flessingue, Harlingen, Rotterdam
Spain	Bilbao, Malaga, Cadiz
United Kingdom	Bristol, Cork, Cowes, Falmouth, Gibraltar, Guernsey, Jersey, Leith, Liverpool, London, Norfolk, Plymouth
Denmark	Copenhagen
Sweden	Stockholmo, Gothenburgo, Nord Kuping, Sundswall, Gefle
France	Havre, Marselha, Nantes
Americas	
United States	Baltimore, Bedford, Boston, Charleston, Dartmouth, Georgetown, Halifax, Houston, Mobile, New Bedford, New Orleans, New York, Philadelphia, Portland, Portsmouth, Providence, Richmond, Salem
Rio da Prata	Buenos Ayres, Montevideo
Chile	Valparaiso

5.4. The evolution of the American consumption of coffee, 1821-1850

	Annual consumption per capita, lbs	Annual consumption, per capita, cups	Daily consumption, per capita, cups
1821	1.4	45.7	0.1
1826	2.7	88.8	0.2
1830	3.0	96.3	0.3
1835	6.1	198.1	0.5
1840	5.0	163.3	0.4
1845	4.7	151.5	0.4
1850	5.6	180.5	0.5

Notes: Annual and daily consumption by cup based on the assumption of 14.3 grams of coffee to a cup, found in historical recipes (Eden, *Cooking*, p. 129), which is close to the Golden Cup Standard (approximately 13 grams per cup) established by the Specialty Coffee Association of America. *Sources*: Imports retained for consumption, United States, *Commerce and Navigation*. Population: Carter et al., *Historical Statistics*.

5.5. Pre- and post-trends of controlled interrupted time series analysis on monthly coffee exports from Rio de Janeiro, truncated series, in metric tons, 1/1827-12/1840

			To		
	USA	World	Europe, Non-Imperial	Europe, Imperial	Core
			Treatment: 7/1832		
Pre	2.9	1.3	1.2	1.7	3.2
	(0.5)	(0.8)	(0.8)	(0.4)	(1.4)
Post	11.2	2.4	2.8	0.8	3.7
	(3.9)***	(2.8)***	(3.3)***	(0.4)	(3.0)***
			Treatment: 5/1830		
Pre	2.2	1.5	1.2	4.9	3.8
	(0.2)	(0.5)	(0.4)	(0.6)	(0.8)
Post	14.7	1.8	1.7	2.1	3.1
	(6.7)***	(2.8)***	(2.7)***	(1.4)	(3.4)***
Adj R^2	0.4	0.1	0.2	0.2	0.2
Obs	168	1680	1344	504	840

Notes: *** p< 0.01, ** p<0.05, *p<0.10. *Sources*: same as figure 5.1.

5.6. Top five firms exporting sugar from Rio de Janeiro, 1827-1840

A	B	C	D	E	F	G
Name	Nationality	% of total exports	% USA of firm exports	Principal ship nationality (count)	Principal destination (weight)	% of total exports
			1827			
F. Le Breton & C.	British	13	0	British (30/34)	Cowes	
James Birckhead & C.	American	8	45	American (14/14)	Lima	
Heyworth Brothers	British	7	0	British (8/10)	London	37
Henry Miller & C.	British	6	0	British (12/16)	Trieste	
William Harrison & C.	British	4	0	British (6/6)	Trieste	
			1835			
George Hudson & C.	British	21	0	British (18/36)	Trieste	
F. Schott	German (?)	8	6	American (9/19)	Trieste	49
J. E. Vibert & C.	British	7	0	Sardo (5/13)	Hamburg	
Priaulx Tupper & C.	British	7	9	British (16/17)	Guernsey	
J. B. Folco	?	6	0	Sardo (29/31)	Genova	
			1840			
George Hudson & C.	British	23	0	British (18/42)	Trieste	
F. Le Breton & C.	British	7	0	Sardo (4/7)	Trieste	
Miller Le Coq & C.	British	5	0	Danish/American (3/7)	Trieste	41
Hoyle Hargreaves & C.	British	3	0	British (2/2)	Cowes	
Jose Ferreira Maia	Brazilian	3	0	Brazilian/Portuguese (3/6)	Lisboa	

Sources: 1/1827-6/1827: *Diario Mercantil*; 7/1827-12/1827, 1835, 1840: *Jornal do Commercio.*

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THE BITTERSWEET CENTURY

DATA APPENDIX

Note: This appendix contains the data underlying the figures presented in the body of the dissertation. The sources and description of the elaboration of the following series are given in the text.

Contents

1.1. Per-capita consumption in pounds (lbs) of coffee and unrefined cane sugar, world and various countries, 1820-1913.

	World	United Kingdom	United States	"Germany"	France
Coffee					
1820	0.2	0.3	1.2	-	-
1830	0.3	0.9	2.9	3.0	0.6
1850	0.5	1.1	6.1	3.2	0.9
1870	0.7	1.0	5.7	3.7	2.7
1890	0.8	0.7	7.7	4.6	3.7
1913	1.3	0.6	8.8	5.7	6.1
Sugar					
1820	0.9	15.3	3.8	-	-
1830	1.2	17.3	5.4	7.0	4.6
1850	2.3	25.1	7.9	2.8	4.6
1870	4.5	36.5	28.4	1.6	8.3
1890	9.5	15.4	33.0	0.6	7.8
1913	22.2	18.0	46.6	0.4	5.6

1.2. Average monthly prices of coffee and brown sugar for five markets, in shillings per hundredweight, 1/1817-12/1850.

Coffee					
	Amsterdam	Hamburg	Liverpool	New York	Rio de Janeiro
1/1817		92.5		104.9	
2/1817		89.8		91.9	
3/1817		91.8		89.4	
4/1817		90.9		91.9	
5/1817		89.9	71.6	92.2	
6/1817		93.0	78.1	91.9	
7/1817		94.2	81.6	93.7	
8/1817		103.6	85.8	95.3	
9/1817		105.4	87.7	99.3	
10/1817		104.8	87.4	111.4	
11/1817		103.6	87.1	116.3	
12/1817		103.4	88.9	123.5	
1/1818		109.7	95.1	124.4	
2/1818		122.0	99.4	120.7	
3/1818		119.7	102.6	121.3	
4/1818		119.7	107.2	122.3	
5/1818		119.7	119.9	132.0	
6/1818		137.3	125.0	128.6	
7/1818		168.7	140.5	140.9	
8/1818		164.5	151.1	154.8	
9/1818		177.7	148.7	168.3	
10/1818		166.0	135.9	162.0	
11/1818		152.6	135.8	161.7	
12/1818		159.3	140.8	155.4	
1/1819		157.1	146.7	150.4	
2/1819		140.9	143.4	141.3	
3/1819		136.0	129.4	139.4	
4/1819		131.0	132.9	147.3	
5/1819		100.4		139.1	
6/1819		98.3		135.4	
7/1819		126.3		111.6	
8/1819		130.4	109.6	125.3	
9/1819		129.2	107.4	132.9	
10/1819		126.0	104.1	132.2	
11/1819		130.2	108.4	131.9	
12/1819		141.4	117.1	123.5	

1/1820		136.2	122.2	128.1	
2/1820		129.4	124.9	126.8	
3/1820		129.0	122.9	126.2	
4/1820		131.2	121.8	129.6	
5/1820		130.9	119.8	128.4	
6/1820		136.9	119.6	127.1	
7/1820		142.7	120.0	123.5	
8/1820		143.4	120.9	127.1	
9/1820		146.0	125.5	128.4	
10/1820		148.7	126.6	122.2	
11/1820		143.8	124.9	127.1	
12/1820		140.5	125.3	121.9	
1/1821		134.3	124.2	118.1	
2/1821		135.9	123.2	115.5	
3/1821		139.3	120.8	120.7	
4/1821		136.0	120.3	118.1	
5/1821		131.2	113.8	118.0	
6/1821		131.7	114.4	126.1	
7/1821		133.1	115.1	120.6	
8/1821		133.1	112.7	116.8	
9/1821		123.4	107.3	119.4	
10/1821		117.4	100.9	116.8	
11/1821		117.2	102.4	107.6	
12/1821		118.8	102.1	113.5	
1/1822		121.7	102.1	124.0	
2/1822		126.2	102.1	124.0	
3/1822		120.7	106.0	122.2	
4/1822		115.7	106.8	126.1	
5/1822		116.3	106.8	124.0	
6/1822		114.8	105.3	124.0	
7/1822		116.3	104.6	125.6	
8/1822		119.1	105.1	122.5	
9/1822		118.6	105.1	122.5	
10/1822		118.4	104.4	121.9	
11/1822		118.0	104.4	121.9	
12/1822		115.1	104.4	115.3	
1/1823		112.9	104.4	112.5	
2/1823		119.6	104.4	115.3	
3/1823		117.4	104.4	111.6	
4/1823		117.0	104.4	119.2	
5/1823		119.6	105.7	117.0	
6/1823		113.7	97.8	113.3	69.1
7/1823		105.8	97.8	112.9	70.5

8/1823		99.2	90.6	109.4	63.0
9/1823		99.2	90.7	108.6	60.3
10/1823		92.1	90.7	109.6	49.6
11/1823		94.2	82.5	103.6	50.2
12/1823		94.8	82.5	99.8	51.8
1/1824		86.9	82.4	95.9	47.9
2/1824		84.7	76.0	94.6	48.6
3/1824		85.4	74.7	94.3	47.9
4/1824		82.3	69.8	92.3	45.8
5/1824		72.3	65.3	88.5	43.7
6/1824		77.1	62.7	86.5	43.0
7/1824		76.9	62.6	84.5	35.6
8/1824		77.3	62.2	84.5	46.2
9/1824		72.6	60.3	84.7	44.1
10/1824		71.6	60.4	83.8	42.9
11/1824		69.8	61.0	79.6	39.2
12/1824		71.3	60.9	79.4	41.8
1/1825		68.8	61.1	80.4	43.6
2/1825		69.0	61.9	80.4	45.7
3/1825		90.8	75.6	79.4	45.1
4/1825		87.1	72.5	96.1	48.1
5/1825		86.1	68.7	90.5	49.2
6/1825		89.2	67.5	84.8	48.5
7/1825		87.8	65.3	81.8	39.5
8/1825		91.2	65.6	80.9	41.8
9/1825		91.0	90.7	81.1	42.1
10/1825		90.8	90.7	82.1	41.4
11/1825		81.6	81.5	79.9	41.8
12/1825		91.9	82.5	78.4	40.7
1/1826		61.1	59.5	76.9	37.2
2/1826		56.8	58.9	74.1	36.7
3/1826		60.4	58.3	74.3	39.6
4/1826		60.4	58.3	74.5	38.0
5/1826		58.2	56.1	74.3	37.4
6/1826		60.4	56.1	68.9	37.7
7/1826		56.0	52.1	68.4	37.0
8/1826		60.0	51.7	68.4	36.1
9/1826		64.0	54.8	68.7	35.5
10/1826		60.4	54.8	69.2	31.1
11/1826		60.4	54.8	69.2	34.8
12/1826		61.5	55.8	69.1	39.3
1/1827		61.6	56.3	68.4	27.2
2/1827		62.1	57.2	68.2	28.8

3/1827		58.0	54.4	67.1	34.1
4/1827		62.0	55.2	67.7	30.4
5/1827		59.7	54.0	67.6	30.2
6/1827		58.3	51.6	66.6	27.1
7/1827		60.1	50.8	66.4	27.9
8/1827		61.4	51.1	66.3	29.9
9/1827		58.8	49.2	66.3	27.7
10/1827		59.7	48.2	66.8	27.4
11/1827		60.0	47.3	66.5	28.3
12/1827		56.7	44.0	66.1	27.3
1/1828	53.0	49.4	43.8	66.3	24.0
2/1828	53.3	47.8	45.1	65.1	26.1
3/1828	46.0	48.8	45.0	61.9	25.2
4/1828	51.7	49.2	44.4	61.0	23.1
5/1828	48.2	48.9	42.8	60.7	23.1
6/1828	46.8	48.4	42.4	61.0	25.5
7/1828		48.2	42.4	61.1	24.5
8/1828	45.2	46.2	42.4	60.6	23.6
9/1828		45.8	42.4	60.6	20.5
10/1828	46.3	45.2	41.9	60.6	21.5
11/1828	52.9	46.2	42.5	60.0	21.3
12/1828	51.4	45.7	42.6	59.1	23.6
1/1829	50.8	45.3	42.7	59.9	19.2
2/1829	51.6	46.8	42.9	59.7	22.2
3/1829	53.2	46.0	42.9	59.8	27.8
4/1829	53.5	44.5	42.9	59.8	26.0
5/1829		44.0	41.7	59.8	21.9
6/1829	50.2	44.3	41.5	59.6	24.2
7/1829	48.9	42.9	41.5	58.9	23.5
8/1829	49.2	42.4	41.1	58.8	22.7
9/1829	48.5	42.4	41.1	59.3	21.6
10/1829	47.6	41.7	40.5	59.1	21.8
11/1829		41.8	40.3	58.8	21.4
12/1829	46.9	42.3	39.8	58.7	22.1
1/1830	46.7	42.6	39.7	59.3	20.4
2/1830	46.8	43.0	37.9	59.1	21.2
3/1830	45.9	40.5	37.9	58.4	19.0
4/1830		41.1	37.9	58.4	21.2
5/1830	43.7	41.2	37.4	58.6	21.4
6/1830	43.7	40.4	38.3	56.9	20.9
7/1830	43.6	39.9	38.3	55.8	20.3
8/1830	42.9	39.9	38.3	54.8	21.7
9/1830	42.8	40.9	38.3	54.8	21.8

10/1830	43.1	41.7	37.2	55.3	21.4
11/1830	44.5	41.2	39.8	56.4	21.4
12/1830	43.9	40.8	39.9	56.1	20.3
1/1831	48.4	42.1	40.2	47.1	24.4
2/1831	48.9	42.4	40.8	46.7	25.3
3/1831	51.9	46.5	42.1	49.1	25.8
4/1831		50.2	43.0	51.1	28.8
5/1831		49.0	42.6	51.6	29.1
6/1831	54.8	46.9	44.3	51.6	26.6
7/1831	50.3	47.5	44.3	51.2	27.3
8/1831	52.4	50.9	53.9	52.6	26.9
9/1831	54.0	52.1	53.9	54.0	24.8
10/1831	57.9	52.3	60.0	57.5	24.6
11/1831	71.5	59.3	60.7	57.2	28.3
12/1831		60.9	60.7	57.2	33.2
1/1832	70.2	60.0	65.5	58.6	50.4
2/1832	69.4	60.2	65.3	58.7	52.1
3/1832		60.0	65.3	58.6	39.5
4/1832	71.8	64.7	66.2	58.1	43.8
5/1832		65.3	66.6	56.3	45.1
6/1832	78.4	64.5	65.1	58.3	43.2
7/1832	83.4	64.3	65.1	58.0	41.4
8/1832	83.4	64.3	68.6	58.1	39.6
9/1832	82.3	67.7	68.6	60.9	43.0
10/1832	78.3	68.3	64.3	64.2	46.4
11/1832	75.2	64.1	64.1	63.3	43.8
12/1832	78.0	62.9	64.1	60.8	44.1
1/1833	77.4	65.5	63.5	59.1	45.1
2/1833	76.7	61.7	64.1	59.7	43.0
3/1833	77.4	57.0	64.8	60.5	39.6
4/1833	75.4	59.7	64.7	57.8	38.7
5/1833	75.5	61.3	65.6	56.0	34.1
6/1833	75.2	62.8	66.3	56.0	37.1
7/1833	74.8	63.6	67.8	57.4	35.7
8/1833	79.4	63.6	73.7	57.8	38.0
9/1833	82.0	64.9	77.2	61.2	39.8
10/1833	82.0	62.5	77.2	61.6	43.7
11/1833	79.5	62.7	76.3	59.2	40.3
12/1833	77.0	61.0	72.0	58.1	40.3
1/1834	74.7	68.9	71.4	57.9	40.0
2/1834	74.8	68.7	70.4	57.9	40.3
3/1834	75.0	67.4	67.6	56.5	40.1
4/1834	76.1	65.2	67.6	55.8	40.1

5/1834	72.8	61.8	63.8	56.0	41.0
6/1834	68.9	58.8	61.4	55.8	39.3
7/1834	67.9	58.4	62.5	55.6	38.2
8/1834	68.2	55.2	62.3	55.0	37.7
9/1834	57.8	56.3	63.0	55.6	37.3
10/1834	61.4	56.3	64.7	57.1	34.2
11/1834	64.1	56.7	64.7	56.8	35.0
12/1834	59.8	59.5	66.0	56.2	35.5
1/1835	65.7	61.0	66.1	53.5	36.2
2/1835		61.4	66.1	53.6	36.7
3/1835	67.1	64.5	66.5	56.1	37.0
4/1835		64.8	67.5	56.1	36.8
5/1835		65.0	67.6	58.1	38.4
6/1835	68.7	65.7	69.8	58.1	38.9
7/1835	65.7	65.4	69.7	57.9	37.4
8/1835	65.1	65.5	69.9	58.4	36.5
9/1835	65.4	66.3	71.0	58.0	37.6
10/1835	76.3	66.2	71.7	57.6	38.3
11/1835	72.8	66.0	71.6	57.6	37.5
12/1835	68.2	66.1	70.8	57.2	36.8
1/1836	68.4	66.6	70.8	57.6	36.5
2/1836	83.3	66.0	70.1	57.4	37.0
3/1836		65.8	68.4	58.0	36.0
4/1836	65.9	65.6	69.5	59.2	37.0
5/1836	62.3	65.4	69.5	59.7	37.9
6/1836	69.0	64.8	66.9	58.1	38.3
7/1836	57.9	64.4	67.3	58.6	38.1
8/1836	59.4	63.2	67.7	58.9	40.7
9/1836	57.1	62.8	70.4	58.3	36.0
10/1836	58.5	58.8	70.6	59.0	39.2
11/1836	65.6	57.3	70.7	57.2	38.5
12/1836		57.4	70.7	57.7	38.3
1/1837	66.6	57.2	67.4	53.7	31.1
2/1837	58.2	56.4	67.5	53.4	30.1
3/1837	51.7	55.9	67.5	53.6	29.9
4/1837	66.8	54.1	66.0	52.2	30.4
5/1837	48.7	51.4	66.0	49.2	32.2
6/1837	66.0	51.1	61.5	48.8	30.5
7/1837	50.9	51.8	62.2	47.7	26.9
8/1837	47.9	50.6	60.8	47.5	25.8
9/1837	62.9	50.7	60.2	47.4	25.7
10/1837	51.4	50.8	61.5	47.8	25.5
11/1837	45.1	51.1	61.9	48.1	25.4

12/1837	50.1	52.2	62.8	49.3	26.0
1/1838	64.6	52.3	62.8	50.7	27.4
2/1838	54.9	53.3	62.7	51.2	30.1
3/1838	59.3	53.9	64.1	51.4	27.5
4/1838	55.8	55.7	63.1	50.7	27.9
5/1838		55.5	63.4	48.7	27.9
6/1838		56.1	63.7	47.3	27.0
7/1838	50.3	56.8	63.5	47.5	28.1
8/1838		56.4	62.1	48.6	28.0
9/1838		57.0	63.5	49.9	27.9
10/1838	50.8	58.0	65.9	51.7	27.3
11/1838		58.0	65.1	51.7	29.0
12/1838		58.7	63.9	52.0	31.0
1/1839		60.4	63.0	50.2	35.2
2/1839		60.2	65.7	51.1	35.3
3/1839		60.9	65.6	51.1	36.7
4/1839	52.8	61.8	65.5	51.5	37.5
5/1839		61.7	65.8	51.5	36.4
6/1839	90.4	61.7	69.6	52.6	34.1
7/1839	73.3	60.7	70.2	53.3	36.0
8/1839	52.8	62.6	69.8	52.9	34.0
9/1839	60.5	62.9	69.9	52.4	33.1
10/1839	55.6	57.6	70.3	51.9	33.0
11/1839		58.1	69.2	52.0	32.7
12/1839	58.4	67.0	68.4	50.3	30.8
1/1840	65.7	67.1	67.5	49.7	31.1
2/1840	59.9	57.5	74.3	50.0	31.3
3/1840	52.5	57.2	74.0	51.2	29.4
4/1840	56.2	57.3	73.1	51.7	29.5
5/1840	54.7	57.4	64.0	50.3	32.2
6/1840	53.9	55.6	62.9	50.1	30.7
7/1840	52.5	55.3	67.4	50.0	31.7
8/1840	52.7	55.5	67.9	49.4	30.5
9/1840	52.5	55.5	69.8	51.2	30.8
10/1840	55.4	55.3	69.9	51.6	31.4
11/1840	55.0	54.9	71.1	51.5	30.8
12/1840	55.8	54.6	70.8	49.4	30.8
1/1841	57.7	54.6	70.6	51.2	30.8
2/1841	56.2	54.8	69.5	50.6	31.0
3/1841	52.4	54.7	66.2	49.7	30.6
4/1841	54.1	57.8	65.8	49.1	29.8
5/1841	57.0	57.9	64.8	49.2	29.6
6/1841	52.3	59.1	64.5	48.3	31.8

7/1841	59.0	59.1	64.9	49.1	31.2
8/1841	52.6	58.3	64.8	49.7	30.6
9/1841	48.1	58.4	64.8	50.3	30.2
10/1841	64.6	58.0	65.0	48.6	28.9
11/1841	50.1	57.2	64.9	47.7	29.3
12/1841	49.6	56.2	64.8	46.7	29.5
1/1842	51.7	53.4	64.8	46.1	25.7
2/1842	52.2	53.3	65.4	45.5	25.3
3/1842	69.3	51.7	65.4	44.3	24.3
4/1842	42.7	51.5	67.5	42.5	22.9
5/1842	63.6	43.9	67.5	43.3	21.9
6/1842	60.8	43.6	66.5	43.2	21.6
7/1842	46.7	49.6	66.5	42.1	22.4
8/1842	39.2	48.9	66.5	41.8	21.5
9/1842	41.7	48.8	66.5	40.5	20.9
10/1842	39.5	56.8	61.8	40.0	20.4
11/1842	49.4	52.9	61.8	39.3	20.3
12/1842	62.0	53.2	61.8	38.4	21.6
1/1843	46.6	51.8	57.5	38.3	20.7
2/1843	44.1	51.8	54.0	38.5	20.6
3/1843	45.6	51.8	53.5	38.0	19.4
4/1843	37.9	51.8	51.2	37.4	20.6
5/1843	48.6	51.2	52.1	36.8	21.3
6/1843	41.1	50.3	50.4	36.2	20.8
7/1843	35.1	47.8	45.6	37.0	20.0
8/1843	36.1	46.8	44.9	37.4	18.9
9/1843	36.1	46.3	47.3	37.5	19.0
10/1843	45.3	46.3	49.0	36.3	19.1
11/1843	35.8	46.0	51.8	35.8	19.2
12/1843	39.1	46.6	51.8	35.6	19.5
1/1844	34.8	46.8	49.3	34.5	18.6
2/1844	37.5	46.7	51.5	34.5	18.8
3/1844	39.8	47.6	53.7	34.3	18.4
4/1844	39.8	47.4	54.2	34.5	17.9
5/1844	40.1	47.1	54.1	34.2	18.6
6/1844	40.3	48.2	53.5	33.7	18.7
7/1844	39.6	48.0	53.5	34.0	19.3
8/1844	40.3	47.9	53.1	34.0	19.2
9/1844	44.3	48.1	48.1	33.5	18.8
10/1844	42.3	47.9	53.1	33.5	19.6
11/1844	56.4	47.3	53.0	32.7	19.7
12/1844	42.8	47.3	53.0	32.2	19.3
1/1845	42.3	47.3	53.0	32.0	19.3

2/1845	37.8	47.8	53.0	31.7	19.0
3/1845	38.6	47.6	53.4	31.9	19.4
4/1845	36.7	47.6	53.4	34.5	19.4
5/1845	37.3	47.1	53.4	34.1	19.6
6/1845	39.4	47.6	53.4	33.4	19.1
7/1845	39.6	49.8	53.0	32.8	22.3
8/1845	44.5	50.0	53.0	33.7	19.6
9/1845		51.6	53.0	35.3	19.8
10/1845		51.1	63.1	36.5	20.1
11/1845	42.1	51.0	62.3	36.6	20.7
12/1845		50.9	62.4	36.6	18.9
1/1846		51.1	61.8	37.1	21.1
2/1846		49.9	61.9	37.1	21.6
3/1846		49.9	61.9	37.8	21.7
4/1846		49.9	61.8	38.5	22.5
5/1846		49.4	60.7	37.5	23.1
6/1846		49.9	59.7	37.4	21.9
7/1846		47.5	58.4	38.0	22.0
8/1846		47.0	58.4	36.6	21.5
9/1846		45.4	58.7	36.0	21.7
10/1846		46.7	58.4	35.8	21.0
11/1846		46.3	56.4	35.5	21.3
12/1846		46.3	55.6	36.2	21.0
1/1847		47.0	55.6	36.5	20.8
2/1847		46.8	50.8	36.6	20.6
3/1847		45.7	51.6	37.3	20.3
4/1847		45.8	42.8	36.5	21.1
5/1847		46.1	49.6	36.2	21.0
6/1847		45.7	48.8	35.6	20.7
7/1847		42.6	48.9	35.0	21.1
8/1847		42.4	48.3	35.0	21.0
9/1847		42.4	48.2	35.2	21.4
10/1847		42.2	48.8	34.8	21.3
11/1847		42.7	46.3	34.9	20.3
12/1847		41.1	45.3	34.3	20.3
1/1848		40.4	44.0	33.2	18.5
2/1848		40.4	43.3	32.9	18.9
3/1848		39.7	44.8	33.5	18.4
4/1848		39.0	45.3	33.3	18.1
5/1848		38.5	37.9	33.0	17.1
6/1848		38.5	38.5	33.7	16.2
7/1848		38.5	35.1	32.1	15.9
8/1848		38.4	36.0	29.9	16.7

9/1848		38.8	36.0	30.0	16.4
10/1848		35.1	35.3	28.9	16.3
11/1848		30.8	35.3	31.0	16.9
12/1848		32.5	35.3	29.9	16.7
1/1849		34.1	40.6	29.6	17.4
2/1849		36.3	40.8	30.4	17.6
3/1849		38.2	40.8	32.1	17.9
4/1849		39.0	41.2	33.0	19.4
5/1849		37.7	41.2	33.1	19.2
6/1849		39.6	40.8	33.2	19.7
7/1849		39.4	41.9	32.2	21.0
8/1849		41.5	42.3	35.5	20.7
9/1849		41.8	45.7	37.0	23.6
10/1849		41.1	46.9	39.3	25.0
11/1849		45.4	49.3	45.8	30.3
12/1849		53.4	54.3	44.5	33.5
1/1850	65.8	57.0	56.7	51.6	40.6
2/1850	64.2	57.2	62.5	62.1	44.3
3/1850		53.0	61.4	58.8	43.6
4/1850		51.7	48.4	48.4	45.3
5/1850		43.8	45.0	43.2	40.5
6/1850		47.4	46.4	43.0	29.2
7/1850		45.3	46.3	46.5	27.6
8/1850	50.9	44.4	46.1	47.2	27.2
9/1850		46.4	47.4	48.8	26.2
10/1850		48.9	53.3	55.3	25.6
11/1850		49.1	52.1	51.6	26.8
12/1850		54.4	53.0	51.9	23.9
Sugar					
	Amsterdam	Hamburg	Liverpool	New York	Campos
1/1817		58.1		66.4	
2/1817		58.7		66.8	
3/1817		58.7		64.6	
4/1817		56.8		60.6	
5/1817		56.2	41.5	59.7	
6/1817		58.4	43.2	56.4	
7/1817		58.9	47.2	54.2	
8/1817		59.5	50.1	54.5	
9/1817		59.1	51.3	57.1	
10/1817		60.2	52.4	57.2	
11/1817		59.3	49.0	58.5	
12/1817		58.1	46.7	58.4	
1/1818		60.3	46.1	61.0	

2/1818		60.3	49.0	60.9	
3/1818		61.6	50.7	57.5	
4/1818		61.3	50.4	57.2	
5/1818		59.0	50.4	58.9	
6/1818		63.5	50.6	58.7	
7/1818		62.8	50.8	59.8	
8/1818		63.3	50.9	61.0	
9/1818		64.0	50.6	62.6	
10/1818		69.2	49.7	63.6	
11/1818		57.8	49.9	65.2	
12/1818		56.3	50.0	64.7	
1/1819		52.8	50.0	61.0	
2/1819		51.5	50.0	61.0	
3/1819		51.9	49.3	61.2	
4/1819		51.6	49.9	61.1	
5/1819		45.8	47.9	54.8	
6/1819		39.7	43.9	55.2	
7/1819		45.9	42.8	48.7	
8/1819		45.5	43.5	46.7	
9/1819		44.2	40.1	50.6	
10/1819		42.2	39.7	51.0	
11/1819		41.7	40.0	52.9	
12/1819		42.0	41.2	52.5	
1/1820		39.1	40.6	50.6	
2/1820		37.6	40.5	50.5	
3/1820		38.9	39.7	48.1	
4/1820		40.0	40.0	44.8	
5/1820		39.3	41.3	43.1	
6/1820		38.1	39.9	43.5	
7/1820		40.2	39.4	42.5	
8/1820		39.2	39.1	43.5	
9/1820		38.5	38.6	39.1	
10/1820		39.0	38.8	41.9	
11/1820		37.5	39.3	42.7	
12/1820		37.4	36.4	43.1	
1/1821		35.7	36.2	39.9	
2/1821		34.8	37.6	40.9	
3/1821		35.5	37.4	44.1	
4/1821		34.9	36.5	40.7	
5/1821		33.3	36.0	43.4	
6/1821		33.5	35.4	40.8	
7/1821		33.0	35.8	38.9	
8/1821		32.3	41.7	40.8	

9/1821		27.7	40.7	38.3	
10/1821		27.0	39.4	40.8	
11/1821		26.0	41.5	41.9	
12/1821		26.1	44.6	41.0	
1/1822		27.5	42.9	39.6	
2/1822		27.5	42.3	39.6	
3/1822		27.5	43.0	39.2	
4/1822		27.5	42.0	40.3	
5/1822		28.8	41.9	40.0	
6/1822		29.4	41.3	39.5	
7/1822		28.4	39.7	38.8	
8/1822		25.3	40.7	38.6	
9/1822		25.0	40.8	38.6	
10/1822		25.3	44.4	38.6	
11/1822		24.9	42.2	38.6	
12/1822		22.0	41.0	38.2	
1/1823		32.5	41.2	38.5	
2/1823		42.5	46.6	38.6	
3/1823		42.5	40.8	38.6	
4/1823		43.5	40.8	37.1	
5/1823		45.0	39.3	37.1	
6/1823		43.5	38.3	37.3	20.4
7/1823		36.4	37.8	37.8	20.1
8/1823		32.9	35.8	37.8	16.4
9/1823		32.9	37.8	38.2	13.9
10/1823		30.5	37.8	39.5	13.9
11/1823		30.9	40.5	39.7	13.9
12/1823		30.7	40.5	40.1	13.9
1/1824		31.3	40.2	40.1	13.9
2/1824		31.1	38.8	39.1	13.9
3/1824		31.1	38.8	40.1	16.0
4/1824		31.1	38.2	40.1	16.6
5/1824		28.9	36.5	39.8	16.0
6/1824		31.5	36.7	39.8	16.8
7/1824		31.5	36.5	39.0	15.5
8/1824		32.0	36.3	38.9	13.8
9/1824		30.9	36.3	39.3	17.9
10/1824		30.1	36.1	39.4	16.8
11/1824		30.9	37.5	39.3	16.6
12/1824		30.9	37.5	39.1	16.6
1/1825		34.7	37.5	39.0	19.4
2/1825		34.7	38.3	34.5	19.4
3/1825		43.8	45.4	34.5	22.4

4/1825		48.9	43.2	37.8	23.9
5/1825		45.9	40.5	41.4	26.8
6/1825		42.7	41.9	40.4	28.3
7/1825		46.0	42.2	40.4	27.6
8/1825		46.8	46.8	41.8	23.9
9/1825		45.0	37.8	45.0	26.8
10/1825		40.4	37.8	45.3	28.3
11/1825		44.8	40.5	43.3	27.6
12/1825		42.2	40.5	39.8	29.1
1/1826		38.9	43.9	39.0	27.7
2/1826		36.9	42.7	37.4	26.3
3/1826		35.6	39.1	37.1	26.3
4/1826		36.4	37.3	37.5	26.3
5/1826		36.0	36.7	37.5	23.5
6/1826		33.9	36.2	35.7	23.5
7/1826		34.4	35.3	34.4	22.8
8/1826		35.3	35.3	33.6	22.1
9/1826		34.4	38.2	33.7	19.4
10/1826		37.7	38.7	37.2	20.8
11/1826		36.1	36.8	37.7	22.1
12/1826		35.6	37.3	37.3	26.3
1/1827		36.0	37.3	36.0	19.3
2/1827		36.6	37.9	35.5	22.3
3/1827		36.0	39.6	35.8	26.3
4/1827		36.0	38.6	37.1	25.3
5/1827		36.0	38.6	36.5	24.3
6/1827		36.5	39.2	36.0	22.3
7/1827		35.7	41.3	35.5	22.8
8/1827		37.1	43.8	36.5	28.4
9/1827		37.8	42.8	36.5	28.4
10/1827		36.0	42.8	38.7	27.9
11/1827		36.0	42.4	37.7	27.4
12/1827		36.0	41.4	37.6	26.3
1/1828	47.2	39.0	40.5	37.7	24.1
2/1828	45.8	38.7	39.5	36.7	25.9
3/1828	44.2	38.6	39.4	37.0	26.8
4/1828	44.2	38.8	38.8	37.7	27.7
5/1828	41.3	38.3	38.8	37.2	26.8
6/1828	40.9	38.1	37.1	36.9	27.7
7/1828		37.9	36.8	37.0	27.2
8/1828	40.3	37.3	36.7	37.5	26.8
9/1828		36.6	37.3	38.0	23.2
10/1828	40.3	35.7	39.6	38.3	22.3

11/1828	39.3	36.1	40.2	38.0	22.3
12/1828	40.7	35.5	39.8	37.4	24.1
1/1829	39.6	33.7	39.8	37.9	19.1
2/1829	39.2	33.7	39.8	37.3	20.5
3/1829	39.7	33.3	37.6	36.5	23.4
4/1829	37.9	30.5	37.2	36.4	24.1
5/1829		30.4	36.7	35.5	21.2
6/1829	35.2	30.3	36.0	34.8	19.8
7/1829	33.8	30.3	35.8	34.5	19.8
8/1829	32.6	29.4	35.8	35.2	17.7
9/1829	32.0	28.9	35.1	35.3	18.4
10/1829	31.3	28.4	34.6	35.0	17.0
11/1829		27.7	34.3	34.7	17.0
12/1829	30.5	27.7	33.8	34.5	17.0
1/1830	30.9	27.5	34.0	34.9	16.4
2/1830	32.2	27.5	34.0	34.9	16.4
3/1830	32.2	27.5	34.0	36.1	16.7
4/1830		27.0	34.0	35.9	17.1
5/1830	28.8	26.1	33.5	35.4	14.4
6/1830	28.0	25.3	32.9	33.7	15.7
7/1830	28.0	24.4	30.5	33.8	14.4
8/1830	28.5	23.7	35.4	33.6	14.4
9/1830	28.6	24.0	35.8	34.1	13.8
10/1830	28.5	24.6	34.6	34.1	11.1
11/1830	26.1	23.5	33.4	33.7	12.5
12/1830	27.6	22.8	32.4	32.6	13.0
1/1831	28.1	23.3	32.4	30.0	14.7
2/1831	27.9	23.1	32.5	28.1	14.7
3/1831	27.9	25.4	31.3	27.2	14.7
4/1831	28.9	26.4	31.3	29.7	14.7
5/1831		26.1	31.3	28.1	12.9
6/1831	28.7	24.8	29.3	28.0	10.1
7/1831	27.3	24.2	28.7	27.0	12.2
8/1831	27.1	24.5	28.2	27.1	10.4
9/1831	28.2	24.2	28.0	27.6	9.3
10/1831	27.9	24.2	29.2	28.0	9.0
11/1831	30.0	24.2	28.8	27.7	9.3
12/1831		24.2	28.8	27.7	11.9
1/1832	30.9	24.9	28.8	27.4	18.6
2/1832	31.5	24.9	29.8	27.6	17.5
3/1832		24.9	29.7	29.5	18.1
4/1832	33.7	27.3	34.2	30.8	18.6
5/1832		29.4	33.8	30.7	17.5

6/1832	32.7	29.4	32.3	30.3	18.1
7/1832	32.7	28.5	32.6	30.2	18.6
8/1832	33.2	28.5	34.0	30.3	17.5
9/1832	33.2	28.5	33.0	31.3	15.3
10/1832	32.3	28.9	32.3	31.5	16.4
11/1832	31.3	28.5	32.7	31.6	17.5
12/1832	35.3	27.6	32.8	31.4	17.5
1/1833	34.0	29.5	32.6	31.6	14.0
2/1833	32.9	25.6	32.3	30.6	16.1
3/1833	33.0	24.8	32.3	31.2	14.0
4/1833	32.6	24.8	29.7	32.0	14.0
5/1833	32.1	25.0	29.9	32.5	12.9
6/1833	30.6	25.8	31.4	32.6	11.8
7/1833	30.6	27.0	31.4	32.7	14.0
8/1833	33.0	26.2	32.9	33.3	15.0
9/1833	34.1	27.7	39.4	40.0	17.7
10/1833	31.0	26.2	38.6	39.8	18.8
11/1833	31.4	25.1	37.8	34.8	19.9
12/1833	30.5	24.3	35.0	33.5	17.2
1/1834	30.5	29.1	33.5	34.4	17.6
2/1834	30.6	29.5	33.0	33.3	17.0
3/1834	30.2	29.9	33.3	33.9	17.6
4/1834	30.3	29.9	32.2	32.6	17.4
5/1834	31.0	29.8	32.2	31.5	17.6
6/1834	30.4	27.7	30.6	31.5	18.7
7/1834	30.1	28.0	32.1	31.2	19.8
8/1834	30.1	28.3	32.1	32.6	19.8
9/1834	30.1	28.4	32.5	33.2	18.7
10/1834	31.3	28.9	34.1	33.5	18.7
11/1834	32.0	29.7	33.2	33.8	19.0
12/1834	34.0	30.2	33.8	33.8	20.9
1/1835	35.1	30.6	34.1	32.3	21.4
2/1835		30.6	34.5	32.2	21.4
3/1835	34.3	32.1	34.2	33.2	21.4
4/1835		32.0	32.8	34.9	20.3
5/1835		32.1	33.4	34.5	20.3
6/1835	33.3	32.1	33.9	34.4	20.9
7/1835	33.8	33.1	34.1	36.3	18.1
8/1835	37.4	36.2	37.5	36.8	18.1
9/1835	42.5	37.0	38.8	36.3	20.3
10/1835	43.0	36.0	38.8	36.9	20.3
11/1835	37.6	34.7	39.6	37.4	22.6
12/1835	41.8	34.0	39.9	37.4	23.7

1/1836	42.8	36.0	39.2	38.5	22.1
2/1836	43.0	37.5	39.3	39.3	22.1
3/1836		37.5	38.8	45.2	19.9
4/1836		39.1	38.2	47.1	20.4
5/1836	42.0	40.0	39.2	45.4	21.5
6/1836	42.8	40.0	39.2	39.8	23.8
7/1836		39.9	45.5	39.8	25.1
8/1836	41.5	36.3	45.5	40.3	24.3
9/1836		35.7	46.2	40.9	24.3
10/1836	39.5	33.0	45.5	40.0	24.3
11/1836		30.7	45.2	36.8	22.7
12/1836		30.4	45.2	33.0	21.0
1/1837	31.1	30.2	38.1	30.7	17.0
2/1837		28.0	37.0	31.3	19.5
3/1837	31.5	27.5	36.3	33.3	17.0
4/1837	33.8	27.9	35.5	30.8	17.0
5/1837		27.9	35.5	27.5	16.6
6/1837	30.8	26.8	35.5	27.5	16.1
7/1837	38.5	25.9	36.1	28.3	16.1
8/1837	37.3	24.6	35.4	29.6	10.6
9/1837	31.0	24.6	35.9	29.4	11.9
10/1837	31.7	25.1	36.9	30.1	12.7
11/1837	35.3	26.3	38.0	32.9	13.2
12/1837		27.3	41.5	33.0	13.2
1/1838	41.8	27.0	40.9	31.8	14.9
2/1838	36.3	28.1	39.9	33.5	16.1
3/1838		29.7	40.4	32.3	16.1
4/1838		29.8	37.6	31.7	16.5
5/1838		28.6	35.4	30.4	16.1
6/1838		28.1	36.0	30.4	14.3
7/1838		28.2	36.4	30.3	13.7
8/1838		27.3	36.4	31.7	14.1
9/1838		27.5	36.4	33.1	16.5
10/1838		27.6	34.4	33.5	17.8
11/1838		27.8	35.8	34.2	16.1
12/1838		28.3	38.2	34.7	16.1
1/1839		28.6	38.7	30.7	18.6
2/1839		28.1	39.3	31.4	18.6
3/1839		28.1	40.7	32.9	18.2
4/1839	33.2	28.2	40.3	32.0	18.2
5/1839	31.0	28.1	40.3	31.8	18.2
6/1839	31.8	27.3	42.9	31.2	17.3
7/1839	36.1	26.7	42.7	31.7	17.3

8/1839	31.1	26.8	41.6	31.6	17.7
9/1839		27.0	42.2	31.5	16.4
10/1839	35.2	26.9	41.1	31.8	16.4
11/1839		27.0	40.0	31.4	14.5
12/1839		26.7	40.1	29.7	15.5
1/1840	29.0	26.6	39.7	27.2	15.2
2/1840	29.5	26.0	41.3	28.4	15.2
3/1840	29.8	26.2	42.1	27.1	15.6
4/1840	30.5	26.5	40.3	26.9	14.7
5/1840	27.3	26.3	43.7	26.9	14.7
6/1840		23.5	48.4	26.8	14.3
7/1840	27.9	23.2	60.0	27.1	14.3
8/1840	28.5	24.4	59.2	28.3	14.3
9/1840	31.0	24.3	60.5	29.9	14.3
10/1840	34.5	23.7	58.2	30.9	16.0
11/1840	31.3	23.7	38.0	31.5	16.0
12/1840	32.0	22.9	37.3	31.4	15.2
1/1841		22.9	35.6	30.7	15.3
2/1841	29.4	23.4	34.5	31.3	15.7
3/1841	27.3	23.4	35.2	29.9	15.7
4/1841	29.3	23.2	34.0	28.5	14.8
5/1841	29.7	23.1	32.1	28.6	14.8
6/1841	24.8	22.9	28.3	27.8	14.8
7/1841	24.6	22.1	26.8	28.8	14.8
8/1841	23.6	22.3	27.3	28.7	14.8
9/1841	31.0	22.2	26.5	29.1	15.7
10/1841	24.9	22.0	26.4	29.0	14.8
11/1841	20.0	21.7	26.9	27.9	13.5
12/1841	20.0	20.9	27.9	26.5	13.5
1/1842		20.8	27.9	26.4	11.9
2/1842	19.3	20.8	28.1	24.1	10.0
3/1842	24.9	20.8	27.7	23.5	8.7
4/1842	20.5	19.6	28.0	21.9	8.7
5/1842	20.0	20.1	26.7	22.1	11.6
6/1842	19.0	19.2	26.5	22.4	11.2
7/1842	19.1	18.8	26.0	22.1	10.0
8/1842	21.9	17.9	26.0	22.4	10.0
9/1842	21.5	17.9	26.0	25.2	10.4
10/1842	20.0	18.0	26.3	24.6	12.7
11/1842	23.5	18.2	26.3	25.0	12.3
12/1842	24.5	19.6	26.3	24.4	12.3
1/1843	26.0	20.6	24.9	23.5	11.9
2/1843	27.8	21.5	24.4	23.6	13.4

3/1843	29.8	23.2	24.4	24.4	13.4
4/1843	28.5	24.1	25.0	25.6	13.7
5/1843	25.3	22.6	26.1	26.7	14.5
6/1843	21.3	21.4	25.7	27.3	14.1
7/1843	24.5	21.5	25.6	28.1	13.4
8/1843	24.3	20.3	25.5	29.7	15.6
9/1843	24.3	20.4	24.9	30.6	14.1
10/1843	26.0	20.4	25.1	29.6	16.3
11/1843	23.9	20.1	25.2	28.8	15.2
12/1843	25.3	21.2	25.2	28.5	13.4
1/1844	24.4	21.1	25.7	28.0	11.6
2/1844	21.6	20.4	25.3	29.0	14.1
3/1844	24.8	20.6	25.8	29.8	13.0
4/1844	24.5	21.1	25.9	30.5	13.0
5/1844	24.5	21.1	25.9	30.2	12.3
6/1844	22.8	21.1	25.5	29.9	11.2
7/1844	24.4	21.2	24.8	28.2	10.9
8/1844	24.7	21.2	24.8	28.4	11.6
9/1844	25.6	21.2	25.7	28.6	13.8
10/1844	25.6	21.5	24.8	28.8	15.2
11/1844	25.3	22.2	24.8	28.8	15.6
12/1844	28.8	24.0	24.8	27.2	12.3
1/1845	27.5	24.5	24.8	26.1	12.8
2/1845	28.8	24.2	23.2	25.0	12.4
3/1845	28.3	24.2	23.5	26.9	13.2
4/1845	26.8	24.2	25.0	33.4	13.2
5/1845	31.7	24.9	24.7	29.7	13.2
6/1845	32.8	26.8	25.0	28.8	13.2
7/1845	35.0	27.2	24.0	29.6	13.7
8/1845		28.4	25.2	30.2	14.3
9/1845	36.7	31.8	25.2	32.3	14.3
10/1845		30.5	28.2	32.1	15.0
11/1845	29.4	28.0	30.5	31.9	15.4
12/1845		27.7	30.5	30.2	15.4
1/1846		27.0	30.2	30.4	13.9
2/1846		26.0	30.2	30.2	15.5
3/1846		25.5	29.2	28.6	15.9
4/1846		24.1	27.0	28.6	15.9
5/1846		22.4	27.6	29.5	16.6
6/1846		22.3	27.7	29.6	17.8
7/1846		24.9	28.6	29.7	17.8
8/1846		24.0	28.5	29.7	17.8
9/1846		24.5	27.7	29.6	15.5

10/1846		24.2	27.2	33.6	16.6
11/1846		23.5	27.9	34.1	16.3
12/1846		24.4	27.4	33.7	16.3
1/1847		24.6	26.7	32.0	15.3
2/1847		23.3	28.3	29.8	14.9
3/1847		28.9	27.9	33.4	15.7
4/1847		32.6	27.0	32.7	16.9
5/1847		28.5	25.1	31.3	16.9
6/1847		28.1	24.3	29.7	16.5
7/1847		23.7	24.5	29.3	16.5
8/1847		23.9	24.1	29.6	16.1
9/1847		24.8	23.3	30.0	17.3
10/1847		26.0	22.9	29.7	17.3
11/1847		23.6	19.5	27.9	15.7
12/1847		22.2	19.6	24.1	14.9
1/1848		21.1	19.6	21.6	12.6
2/1848		21.3	22.5	21.3	14.0
3/1848		21.4	20.7	20.6	14.4
4/1848		20.2	20.0	20.0	14.4
5/1848		18.0	22.4	18.7	14.7
6/1848		17.7	23.2	19.0	14.4
7/1848		17.5	23.3	19.1	14.7
8/1848		18.5	19.6	19.2	13.3
9/1848		18.7	19.6	19.5	15.1
10/1848		19.0	19.5	22.8	15.5
11/1848		17.9	19.4	20.1	15.5
12/1848		18.4	19.0	20.0	15.5
1/1849		19.8	20.9	20.6	16.0
2/1849		21.3	21.6	19.8	15.3
3/1849		23.1	20.9	21.0	14.9
4/1849		23.7	23.0	21.6	16.0
5/1849		23.9	23.1	22.3	16.0
6/1849		23.9	23.1	21.8	16.0
7/1849		24.2	24.3	21.8	16.7
8/1849		22.9	24.0	22.1	16.4
9/1849		23.5	24.0	23.6	15.6
10/1849		21.5	23.0	25.6	12.6
11/1849		21.6	22.3	25.1	13.4
12/1849		21.0	22.1	24.2	13.0
1/1850	26.9	23.1	21.2	21.3	14.5
2/1850	27.0	23.0	21.6	21.6	15.7
3/1850	26.3	21.0	21.2	21.9	14.9
4/1850	23.5	21.7	20.7	20.9	15.3

5/1850	21.9	19.1	20.7	21.2	15.3
6/1850	22.4	19.8	21.3	21.1	14.5
7/1850	22.5	20.2	21.6	23.3	14.9
8/1850	23.6	19.5	21.9	25.4	14.1
9/1850	26.0	21.0	23.0	28.1	14.1
10/1850	28.8	22.5	24.7	28.6	14.1
11/1850	27.0	23.0	24.7	28.4	16.5
12/1850	26.0	22.2	24.4	25.8	14.1

2.1 and 2.2. Price accuracy indices, aggregate and by commodity, Brazil, 1821-1913.

	Aggregate	Coffee	Cotton	Sugar	Cacao	Hides	Rubber
1821	1.08	0.85	1.41	1.07	0.48	1.16	
1822	0.92	0.69	1.51	0.74	0.48	1.01	
1823	0.82	0.60	1.45	0.71	0.40	1.03	
1824	0.81	0.62	1.31	0.70	0.33	0.95	
1825	0.92	0.69	1.16	0.82	0.37	1.06	
1826	0.91	0.63	1.73	0.97	0.38	1.10	
1827	0.79	0.56	1.36	0.80	0.32	0.98	
1828	0.80	0.49	1.09	0.90	0.19	0.90	
1829	0.78	0.55	1.07	0.82	0.11	1.01	
1830	0.72	0.51	0.85	0.73	0.07	1.01	
1831	0.70	0.65	1.26	0.54	0.16	0.66	
1832	0.78	0.82	1.10	0.68	0.25	0.69	
1833	0.75	0.78	1.04	0.62	0.40	0.67	
1834	0.72	0.82	0.83	0.54	0.37	0.67	
1835	0.68	0.81	0.54	0.56	0.41	0.77	
1836	0.67	0.82	0.56	0.51	0.55	0.87	
1837	0.68	0.82	0.76	0.46	0.56	0.96	
1838	0.60	0.72	0.74	0.42	0.56	0.77	
1839	0.65	0.70	0.82	0.52	0.58	0.76	
1840	0.63	0.72	1.31	0.46	0.45	0.71	
1841	0.62	0.68	1.09	0.48	0.43	0.64	
1842	0.63	0.66	1.13	0.52	0.39	0.64	
1843	0.59	0.63	1.12	0.46	0.41	0.61	
1844	0.58	0.65	0.89	0.46	0.42	0.59	
1845	0.59	0.71	1.09	0.46	0.47	0.61	
1846	0.63	0.69	1.01	0.53	0.47	0.62	
1847	0.65	0.67	0.92	0.59	0.51	0.64	
1848	0.75	0.77	1.21	0.72	0.46	0.61	
1849	0.68	0.70	0.96	0.63	0.39	0.66	
1850	0.66	0.65	0.77	0.60	0.51	0.69	0.62
1851	0.74	0.84	1.06	0.73	0.50	0.65	0.66
1852	0.73	0.78	0.94	0.80	0.55	0.65	0.71
1853	0.68	0.75	0.90	0.74	0.61	0.59	1.26
1854	0.68	0.75	0.88	0.92	0.67	0.74	0.68
1855	0.73	0.79	0.88	0.79	0.77	0.78	0.84
1856	0.79	0.81	0.90	0.96	1.14	0.74	0.95
1857	0.74	0.79	0.77	0.82	0.73	0.79	0.88
1858	0.83	0.93	0.66	0.92	0.94	0.87	1.03
1859	0.83	0.83	0.69	0.87	0.89	0.80	0.71
1860	0.77	0.78	0.92	0.81	0.90	0.89	0.63
1861	0.79	0.86	0.79	0.86	0.90	0.86	0.88

1862	0.74	0.79	0.66	0.83	0.90	0.82	0.73
1863	0.84	0.82	0.80	1.00	0.94	0.89	0.78
1864	0.79	0.84	0.67	0.87	1.03	0.79	0.86
1865	0.82	0.81	0.79	0.87	1.27	0.84	0.91
1866	0.81	0.83	0.73	0.90	0.98	0.91	0.71
1867	0.80	0.82	0.87	0.88	0.98	0.96	0.80
1868	0.78	0.74	0.79	0.83	1.02	0.84	0.77
1869	0.83	0.71	0.74	0.78	1.02	0.87	0.60
1870	0.85	0.75	0.78	0.80	0.99	0.90	0.64
1871	0.80	0.68	0.86	0.73	0.99	1.03	0.76
1872	0.79	0.71	0.82	0.69	0.83	1.07	0.79
1873	0.85	0.90	0.73	0.72	0.95	1.03	0.78
1874	0.84	0.84	0.74	0.66	0.99	0.98	0.81
1875	0.84	0.83	0.78	0.67	1.32	1.01	0.87
1876	0.89	0.86	0.81	0.88	1.36	1.17	0.91
1877	0.79	0.72	0.82	0.63	1.06	0.86	0.92
1878	0.76	0.65	0.78	0.74	0.79	0.79	0.99
1879	0.87	0.89	0.81	0.79	0.78	0.70	0.70
1880	0.88	0.93	0.75	0.72	0.86	0.64	0.52
1881	0.92	0.86	0.77	0.72	0.98	0.66	0.54
1882	0.76	0.67	0.65	0.70	1.07	0.73	0.45
1883	0.69	0.67	0.71	0.66	0.88	0.67	0.33
1884	0.82	0.80	0.72	0.69	0.87	0.67	0.39
1885	0.74	0.75	0.74	0.70	0.88	0.65	0.47
1886	0.72	0.76	0.96	0.59	0.72	0.68	0.42
1887	0.80	0.79	1.02	0.78	0.79	0.86	0.58
1888	0.94	0.94	1.00	1.16	0.63	1.38	0.85
1889	0.86	0.82	1.23	1.15	0.69	1.30	0.66
1890	0.88	0.85	1.05	1.14	0.67	1.12	0.59
1891	0.83	0.77	1.21	1.35	0.57	0.84	0.60
1892	0.80	0.76	1.12	1.36	0.78	0.82	0.78
1893	0.99	0.95	1.22	1.57	0.75	0.74	0.78
1894	0.92	0.89	1.28	1.29	0.64	0.77	0.82
1895	0.80	0.78	1.48	1.45	0.47	0.55	0.81
1896	0.66	0.64	1.36	1.12	0.42	0.60	0.65
1897	0.56	0.52	1.52	1.22	0.62	0.54	0.81
1898	0.76	0.73	1.32	1.35	0.86	0.51	1.16
1899	0.88	0.87	1.28	1.39	0.92	0.78	1.07
1900	1.02	1.01	1.37	1.66	0.68	0.92	0.94
1901	0.83	0.82	0.85	1.01	0.79	0.93	0.89
1902	0.85	0.83	0.90	1.16	0.71	1.05	0.86
1903	0.78	0.75	0.82	1.27	0.86	1.16	0.90
1904	0.95	0.93	0.98	1.64	0.84	1.14	0.88
1905	0.91	0.91	0.75	1.25	1.00	0.96	0.91
1906	1.00	1.00	0.92	1.33	1.06	1.00	0.89

1907	0.99	1.01	0.97	0.72	0.90	0.90	0.89
1908	0.92	0.93	0.99	1.06	0.90	0.78	0.90
1909	0.99	1.00	0.90	1.07	0.95	0.92	0.90
1910	1.23	1.34	0.90	1.03	0.93	0.80	1.01
1911	1.10	1.13	1.02	1.32	0.90	0.86	0.85
1912	1.00	1.03	1.00	0.96	0.92	0.76	0.71
1913	0.88	0.90	1.02	1.36	0.85	0.66	0.92

2.3. Openness of Brazilian economy, percentage of total exports in GDP, values at current prices, 1821-1913.

	Tombolo & Sampaio	Contador & Haddad	Goldsmith
1821	0.30		
1822	0.31		
1823	0.34		
1824	0.30		
1825	0.29		
1826	0.20		
1827	0.29		
1828	0.33		
1829	0.35		
1830	0.37		
1831	0.34		
1832	0.28		
1833	0.36		
1834	0.32		
1835	0.37		
1836	0.35		
1837	0.35		
1838	0.39		
1839	0.34		
1840	0.36		
1841	0.34		
1842	0.39		
1843	0.36		
1844	0.36		
1845	0.36		
1846	0.34		
1847	0.33		
1848	0.33		
1849	0.32		
1850	0.35		0.25
1851	0.29		0.21
1852	0.28		0.22
1853	0.30		0.23
1854	0.31		0.24
1855	0.31		0.24
1856	0.30		0.23
1857	0.32		0.23
1858	0.27		0.18
1859	0.29		0.21
1860	0.31		0.21

1861	0.29	0.24	0.21
1862	0.31	0.26	0.22
1863	0.30	0.25	0.21
1864	0.30	0.38	0.22
1865	0.30	0.28	0.21
1866	0.29	0.28	0.20
1867	0.29	0.28	0.19
1868	0.35	0.29	0.24
1869	0.26	0.28	0.21
1870	0.22	0.29	0.19
1871	0.24	0.30	0.20
1872	0.26	0.34	0.22
1873	0.21	0.30	0.19
1874	0.24	0.34	0.19
1875	0.22	0.35	0.18
1876	0.22	0.31	0.17
1877	0.26	0.36	0.20
1878	0.27	0.41	0.21
1879	0.22	0.34	0.17
1880	0.21	0.33	0.17
1881	0.21	0.36	0.18
1882	0.24	0.37	0.20
1883	0.25	0.30	0.20
1884	0.22	0.35	0.18
1885	0.22	0.34	0.19
1886	0.22	0.35	0.19
1887	0.21	0.40	0.18
1888	0.15	0.31	0.13
1889	0.22	0.44	0.17
1890	0.21	0.35	0.15
1891	0.28	0.31	0.18
1892	0.30	0.36	0.22
1893	0.25	0.27	0.19
1894	0.31	0.27	0.20
1895	0.37	0.31	0.24
1896	0.31	0.32	0.27
1897	0.34	0.33	0.32
1898	0.23	0.23	0.23
1899	0.20	0.21	0.19
1900	0.21	0.21	0.18
1901	0.28	0.34	0.26
1902	0.26	0.31	0.23
1903	0.27	0.34	0.24
1904	0.22	0.29	0.19
1905	0.21	0.34	0.18

1906	0.17	0.34	0.18
1907	0.19	0.34	0.17
1908	0.17	0.33	0.16
1909	0.21	0.43	0.19
1910	0.15	0.32	0.13
1911	0.16	0.40	0.15
1912	0.17	0.52	0.16
1913	0.19	0.51	0.17

2.4. World export market shares (%): coffee, 1823-1910, sugar, 1820-1900.

Coffee									
	Cuba	Guadeloupe	Haiti	Jamaica	Martinique	Brazil	Surinam	Indonesia (Java)	Others
1823/25	12	1	20	11	1	15	3	18	25
1825/30	15	1	16	8	1	20	2	18	23
1830/35	13	0	13	4	0	32	1	16	22
1835/40	10	0	10	2	0	35	1	22	21
1840/45	6	0	8	1	0	37	0	26	21
1845/50	3	0	7	1	0	48	0	20	20
1850/55	2	0	8	1	0	54	0	25	11
1855/60	1	0	8	1	0	54	0	23	13
1860/65	1	0	8	1	0	43	0	21	25
1865/70	0	0	5	1	0	52	0	18	23
1870/75	0	0	6	1	0	48	0	11	34
1875/80	0	0	6	1	0	47	0	7	39
1880/85	0	0	5	1	0	57	0	15	22
1885/90	0	0	6	1	0	49	0	11	33
1890/95	0	0	5	1	0	58	0	9	27
1895/00	0	0	4	1	0	67	0	7	22
1900/05	0	0	3	0	0	75	0	4	17
1905/10	0	0	3	0	0	78	0	2	16

Sugar							
	French Caribbean	British Caribbean	Danish and Dutch Caribbean	Spanish Caribbean	Brazil	Africa/Asia	Others
1820	10	55	4	14	9	1	9
1830	11	35	3	18	11	9	13
1840	7	15	2	23	11	15	28
1850	3	13	1	29	10	16	28
1860	3	12	0	31	7	19	28
1870	3	10	0	28	5	13	41
1880	2	7	0	20	5	9	56
1890	1	5	0	12	2	9	70
1900	1	2	0	4	2	9	83

2.5. World export market share (%), 1820-1870.

	Brazil	South USA	British West India	Cuba
1823	2.9	5.8	3.8	0.8
1824	2.9	4.2	4.2	1.0
1825	2.9	5.0	3.4	0.9
1826	2.4	4.8	3.7	1.1
1827	2.9	6.8	3.3	1.0
1828	3.1	5.0	4.1	1.0
1829	2.9	5.5	4.3	1.2
1830	3.1	5.9	4.1	1.5
1831	3.3	5.7	3.7	1.0
1832	3.6	6.5	2.8	0.8
1833	4.4	5.9	2.5	0.7
1834	4.1	6.6	3.2	0.9
1835	4.4	6.6	2.5	0.7
1836	4.1	6.8	2.2	0.6
1837	4.1	7.3	2.4	0.7
1838	3.8	8.5	2.5	0.9
1839	4.1	6.0	1.7	0.7
1840	3.9	9.5	1.3	0.6
1841	3.8	7.4	1.3	0.9
1842	4.0	8.3	1.5	1.1
1843	4.1	9.2	1.5	1.0
1844	4.1	7.8	1.3	0.9
1845	4.2	9.2	1.3	0.7
1846	4.6	6.3	1.1	0.8
1847	5.1	5.9	1.5	1.2
1848	5.3	8.6	1.3	1.3
1849	4.0	8.9	1.0	0.9
1850	4.3	6.1	1.0	1.0
1851	4.6	7.6	1.0	1.3
1852	4.3	8.4	0.9	1.0
1853	3.9	7.9	0.7	0.9
1854	4.2	7.2	0.8	1.0
1855	4.4	7.2	0.7	1.0
1856	3.9	8.0	0.6	0.8
1857	3.6	6.5	0.7	0.7
1858	3.6	6.7	0.8	0.9
1859	3.3	7.8	0.7	1.2
1860	3.1	9.1	0.6	0.8
1861	3.6	2.4	0.7	0.8
1862	3.4	0.6	0.8	1.2
1863	2.9	0.6	1.0	1.1

1864	3.0	0.5	1.0	1.1
1865	3.0	0.6	0.8	1.0
1866	3.0	3.1	0.6	1.0
1867	3.4	3.1	0.6	1.1
1868	3.6	3.6	0.7	1.4
1869	3.3	2.8	0.6	1.4
1870	3.0	3.7	0.7	1.5
1871	3.2	5.0	0.6	0.9
1872	3.0	3.3	0.5	0.9
1873	2.5	3.9	0.4	0.9
1874	2.5	4.6	0.5	1.0
1875	2.5	4.0	0.5	1.0
1876	2.4	4.5	0.5	0.8
1877	2.5	4.5	0.5	0.7
1878	2.6	4.7	0.5	0.8
1879	2.3	4.7	0.5	0.9
1880	2.1	4.7	0.5	0.8
1881	2.3	5.2	0.4	0.8
1882	2.6	4.1	0.5	0.8
1883	2.6	5.1	0.5	0.8
1884	2.6	4.1	0.5	0.8
1885	2.6	4.3	0.5	0.8
1886	2.4	4.6	0.5	0.7
1887	2.2	4.7	0.5	0.5
1888	1.9	4.6	0.5	0.5
1889	2.2	4.5	0.5	0.4
1890	2.0	4.6	0.5	0.4
1891	2.2	5.5	0.5	0.4
1892	2.8	5.6	0.5	0.7
1893	2.3	4.4	0.5	0.8
1894	2.3	5.0	0.5	0.8
1895	2.6	6.0	0.4	0.7
1896	2.5	3.9	0.4	0.6
1897	3.2	4.8	0.4	0.4
1898	3.1	5.8	0.4	0.4
1899	2.8	5.4	0.4	0.5
1900	2.8	4.7	0.4	0.5
1901	4.1	4.8	0.4	0.7
1902	3.7	4.8	0.5	0.8
1903	3.6	4.8	0.4	1.0
1904	2.7	4.0	0.4	1.0
1905	2.8	5.1	0.4	0.8
1906	3.2	4.2	0.4	0.9
1907	3.2	5.1	0.4	0.9
1908	3.0	4.4	0.4	0.8

1909	3.5	4.9	0.4	1.0
1910	2.4	3.5	0.3	1.0
1911	2.3	4.0	0.3	0.8
1912	2.3	5.1	0.3	1.0
1913	2.5	4.1	0.3	1.1

2.6. Price of coffee, cotton and sugar, pounds sterling per metric ton, 1830-1850.

	Coffee Jamaica to UK	Coffee Brazil to US	Coffee Cuba to US	Cotton British Guyana to UK	Sugar Jamaica to UK	Sugar Cuba to US
1821	88.9	111.5	110.0	75.2	26.8	39.1
1822	83.1	107.0	103.8	68.8	24.2	38.7
1823	70.8	97.5	94.8	62.9	26.6	39.3
1824	45.8	72.2	72.6	61.8	25.2	41.0
1825	48.5	69.1	68.3	96.6	33.9	45.7
1826	36.2	60.6	58.6	52.3	24.2	41.9
1827	32.1	54.8	52.4	47.9	30.0	43.6
1828	24.9	51.9	50.0	47.3	27.0	45.6
1829	26.3	48.6	48.4	47.5	22.4	41.2
1830	24.9	45.9	45.1	49.6	18.8	39.0
1831	45.9	46.5	44.2	47.0	19.7	34.5
1832	64.1	51.9	50.3	51.9	21.7	35.9
1833	72.1	51.5	51.9	68.3	24.7	38.7
1834	55.0	50.5	48.5	71.7	24.4	40.5
1835	71.0	50.1	49.1	84.4	28.6	43.4
1836	66.2	47.2	48.2	79.3	34.0	46.2
1837	54.5	41.2	40.6	53.9	27.0	34.4
1838	70.1	42.6	39.8	51.1	26.6	37.6
1839	80.6	43.4	40.9	60.0	31.8	32.8
1840	69.6	41.3	40.0	46.8	40.2	33.3
1841	52.2	41.9	38.6	47.9	31.8	31.9
1842	52.8	36.8	30.8	39.5	29.6	27.7
1843	43.0	30.1	26.2	34.8	27.3	31.7
1844	40.3	26.0	24.2	36.9	27.4	30.4
1845	34.5	27.0	24.6	30.1	26.0	36.4
1846	32.7	28.7	25.5	34.7	27.7	33.6
1847	30.7	28.8	26.5	47.8	22.9	30.0
1848	26.7	24.9	23.8	31.6	18.3	22.5
1849	25.4	30.2	28.0	36.6	20.1	26.0
1850	34.4	42.5	39.6	57.9	20.4	29.8

3.1. Accuracy test of geographical distribution of imports, Brazil, Argentina, Uruguay, 1841-1913.

	Brazil	Argentina	Uruguay
1841	1.0		
1842	1.1		
1843			
1844			
1845	0.8		
1846	0.7		
1847	0.8		
1848	1.0		
1849	1.0		
1850			
1851			
1852	1.1		
1853	1.1		
1854	1.2		
1855	1.1		
1856	1.2		
1857	1.0		
1858	1.2		
1859	1.0		
1860	1.0		
1861	0.9		
1862	1.0	0.9	
1863	1.2	0.8	
1864	0.9	0.6	
1865	0.9	0.9	
1866	0.6	0.8	
1867		0.6	
1868		0.9	
1869			0.9
1870		1.0	
1871	1.0	0.8	
1872	0.9	0.8	0.6
1873		1.0	0.8
1874		1.0	0.8
1875			0.8
1876		0.9	
1877		0.7	
1878		0.8	
1879		0.9	0.9
1880		0.7	0.9

1881		0.8	0.7
1882		0.8	0.7
1883		1.0	1.0
1884		0.9	1.0
1885		1.1	1.1
1886		1.0	0.9
1887		1.0	0.9
1888		1.0	1.1
1889		1.0	1.0
1890		1.2	0.9
1891		1.1	1.0
1892		1.2	1.1
1893		1.2	1.0
1894		1.4	1.4
1895		1.3	1.3
1896		1.2	1.2
1897		1.3	1.3
1898		1.3	1.3
1899	0.6	1.2	1.3
1900	0.9	1.0	1.0
1901	1.2	1.1	1.2
1902	1.2	1.2	1.0
1903	1.1	1.0	1.0
1904	1.2	1.1	0.9
1905	1.1	0.9	0.9
1906	1.1	0.9	0.9
1907	1.1	1.0	0.9
1908	1.2	1.0	1.0
1909	1.2	1.0	1.0
1910	1.0	0.9	0.9
1911	1.1	1.0	0.9
1912	1.1	1.0	0.9
1913	1.2	1.0	0.5

3.2. Sum of trading partner samples, official import series, and re-estimate of total imports, current prices, in US dollars and British sterling, Brazil, 1821-1913.

	Sum sample		Official		Re-estimate	
	Dollars	Sterling	Dollars	Sterling	Dollars	Sterling
1821	12904094	2676754	22035877	4571000	24863476	5157541
1822	11788147	2368192	22847643	4590000	22713280	4563007
1823	9600397	2000291	19663552	4097000	18497946	3854140
1824	14804052	3041533	23543130	4837000	28524294	5860394
1825	16816517	3482041	23823924	4933000	32401892	6709161
1826	16726520	3399423	18377694	3735000	32228486	6549973
1827	17557335	3557141	19516153	3954000	28496209	5773372
1828	24413221	4953579	20305008	4120000	39495794	8013918
1829	18643405	3834514	17794920	3660000	30163287	6203885
1830	16942233	3558097	19079731	4007000	27408876	5756232
1831	10790731	2220269	16927728	3483000	15985625	3289156
1832	17207497	3542314	22952633	4725000	25439201	5236882
1833	22683119	4738285	27090765	5659000	33531761	7004462
1834	20670294	4456534	26801839	5778500	29720563	6407780
1835	25363788	5229863	30655586	6321000	36432385	7512142
1836	30354997	6301247	33709057	6997500	43574456	9045411
1837	25138397	4930548	31307339	6140500	36168302	7093910
1838	24288776	4970791	26388463	5400500	32608832	6673522
1839	25748024	5165618	31591761	6338000	32296452	6479377
1840	31025179	6204664	35887153	7177000	36206708	7240907
1841	27711125	5554111	36262232	7268000	31711677	6355937
1842	21833152	4551228	30543772	6367000	25466820	5308684
1843	22423617	4683491	27769240	5800000	26229815	5478469
1844	27153226	5587658	28532554	5871500	31804662	6544842
1845	25669963	5269633	27598350	5665500	33439480	6864591
1846	39101387	8119227	28380099	5893000	49589234	10296982
1847	24852210	5184673	28233126	5890000	32883459	6860153
1848	22525414	4626767	26533325	5450000	25503324	5238436
1849	23603718	4903242	28286476	5876000	28874464	5998144
1850	25867724	5311430	37970514	7796500	31920605	6554270
1851	38995914	7937776	50303592	10239500	45856291	9334234
1852	35265231	7194343	52071821	10623000	43109879	8794704
1853	36644168	7497221	49294898	10085500	44457373	9095766
1854	35478185	7266248	48806470	9996000	42903604	8787041
1855	42573643	8713037	49971167	10227000	48841080	9995719
1856	54753753	11153976	61427520	12513500	58581602	11933753
1857	58674450	12002301	70449615	14411000	75144901	15371456
1858	44869527	9237165	68005000	14000000	56027237	11534171
1859	47849912	9786859	61980388	12677000	61510408	12580874

1860	50648735	10444546	60858715	12550000	64682544	13338532
1861	55206411	11384408	60788400	12535500	66620423	13738153
1862	46085560	9503549	54891651	11319500	59768528	12325187
1863	46444070	9577479	60943578	12567500	59212180	12210459
1864	69575388	14347512	70222713	14481000	98608451	20334574
1865	67649631	13950391	70445781	14527000	83868381	17294946
1866	74700010	15404287	69883262	14411000	119159489	24572513
1867	62610839	12911315	66942162	13804500	94796434	19548478
1868	56870109	11727488	60490168	12474000	86234853	17782949
1869	71296769	14702487	60608976	12498500	98313822	20273817
1870	55263758	11396234	68181158	14060000	69609464	14354539
1871	61406458	12662953	72666761	14985000	75420713	15552907
1872	75259967	15519759	76524379	15780500	91189438	18804660
1873	77003775	15879359	80316531	16562500	95147571	19620888
1874	77740647	16031313	83902589	17302000	96479559	19895564
1875	74255251	15312571	90965594	18758500	93533976	19288140
1876	67995924	14021802	87350441	18013000	87981773	18143190
1877	71874279	14821578	80575969	16616000	92541845	19083547
1878	70537447	14545903	78459249	16179500	91888833	18948886
1879	68571585	14128276	75435524	15542500	90735362	18694831
1880	80393186	16594733	77470822	15991500	96107311	19838438
1881	80051873	16575603	80048963	16575000	97374982	20162539
1882	80445327	16519226	81332965	16701500	99500059	20432063
1883	76712195	15820209	84782341	17484500	95661426	19728073
1884	74071665	15260552	81466179	16784000	92931604	19146154
1885	62962236	12965864	74508036	15343500	81685093	16821477
1886	67578968	13901133	76387178	15713000	89063236	18320491
1887	68613655	14141897	86119450	17750000	91855184	18932187
1888	74832715	15365114	96061797	19724000	102087168	20961166
1889	89984707	18482286	116858537	24002000	122412408	25142730
1890	99649502	20501904	116744350	24019000	139134685	28625591
1891	114216363	23495991	124274022	25565000	159360006	32782705
1892	105004439	21547770	128172276	26302000	148184721	30408718
1893	108303449	22266792	127507139	26215000	149597359	30756668
1894	108388422	22224860	132383451	27145000	147858259	30318083
1895	116891165	23912437	142797020	29212000	154802517	31667966
1896	109053971	22387496	135809056	27880000	145601118	29890195
1897	86988672	17886758	111807267	22990000	121891334	25063503
1898	89553646	18473430	114095467	23536000	122785595	25328629
1899	86100665	17702345	109741919	22563000	117466183	24151113
1900	79216806	16282333	104159067	21409000	109372196	22480514
1901	63457468	13023061	104163708	21377000	92366299	18955876
1902	72125460	14804380	113412960	23279000	105477272	21650131
1903	76716760	15775279	117725925	24208000	110200787	22660605
1904	82512583	16951389	126143854	25915000	118094971	24261437

1905	94670143	19458633	145128916	29830000	138154644	28396498
1906	115879577	23888756	161065963	33204000	160268268	33039554
1907	138745818	28560863	196880971	40528000	184096083	37896227
1908	118134276	24279488	172685010	35491000	160428015	32971887
1909	119376217	24497982	180974633	37139000	162096849	33264965
1910	191071659	39290903	232801536	47872000	257007945	52849670
1911	181590607	37346648	256836411	52822000	238157845	48980492
1912	217958257	44793920	308613365	63425000	287486638	59083118
1913	217429485	44704543	326675274	67166000	286781370	58963622

Total exports to Brazil, in British sterling, underlying estimation of sum sample.

	UK	US	SPA	FRA	POR	CHI	HAM	GER	BEL	Sum
1821	2256126	420628								2676754
1822	1995539	372653								2368192
1823	1636298	363993								2000291
1824	2397962	643570								3041533
1825	2779256	702785								3482041
1826	2784490	614933								3399423
1827	2482788	489342		585011						3557141
1828	3746102	535837		671640						4953579
1829	2679523	517185		637805						3834514
1830	2610915	466569		480613						3558097
1831	1332783	556589		248050			82848			2220269
1832	2293836	634790		375850			237838			3542314
1833	2753894	909129		817199			258064			4738285
1834	2639382	588330		996242			220687		11892	4456534
1835	2812505	754075		1169505			462137		31640	5229863
1836	3233217	991396		1499522			520598		56514	6301247
1837	1963988	463949		1154955	585350		667404		94903	4930548
1838	2827778	723635		1357406					61971	4970791
1839	2840281	690781		1335040			273738		25778	5165618
1840	2841021	644399		1795914			878382		44948	6204664
1841	2739912	683424		1779488			285823		65463	5554111
1842	1923218	684054		1284910	306377		300125		52543	4551228
1843	2351520	463494		1387446	255140		187347		38544	4683491
1844	2655444	731848		1590129	262647		262878		84712	5587658
1845	2746941	738715		1423475		13759	272429		74314	5269633
1846	3031508	1795553		1319957		46490	1849114		76607	8119227
1847	2844910	727502		1253381		17454	245236		96190	5184673
1848	2265807	821952		885528	347707	7739	214056		83978	4626767
1849	2681094	765390	27119	1127947			207558		94134	4903242
1850	2820281	840739	27035	1193377		292	315369		114337	5311430

1851	3900617	990351	31639	1817541	415406	108842	533652		139727	7937776
1852	3836383	737902	45066	1775082		50380	602066		147463	7194343
1853	3541353	972222	58077	2100194		25682	672270		127424	7497221
1854	3344410	1014385	104667	1947936		26600	685010		143240	7266248
1855	3829875	1042276	120969	2207116	729376		624512		158914	8713037
1856	4731641	1216134	156020	3095687	955776	32970	798165		167581	11153976
1857	6358258	1330439	191593	3852739		72951			196322	12002301
1858	4582554	1171314	179788	3032344		82910			188254	9237165
1859	4240087	1489736	191695	3604633		95387			165320	9786859
1860	5049071	1500665	195698	3479323		35530			184257	10444546
1861	5199412	1190399	171732	3955153	640495	69582			157635	11384408
1862	4256042	895768	202036	4028385		3035			118283	9503549
1863	4483572	1170441	151557	3553886		80050			137974	9577479
1864	6981980	1270359	205053	5609861		64874			215385	14347512
1865	6309775	1478768	219959	5159509	617509	47246			117624	13950391
1866	8032660	1308360	153455	5024654	694575	59773			130810	15404287
1867	6370976	1154655	179044	4374197	610720	48171			173552	12911315
1868	6014108	1299861	190905	3398393	653616	62132			108473	11727488
1869	7811933	1343733		4347810	778481				420530	14702487
1870	6092738	1309740	137976	2902296	756101	21436			175947	11396234
1871	7137087	1367781	234863	2785565	835931	6819			294908	12662953
1872	8562561	1357348	213316	4150005	834200	23681			378649	15519759
1873	8726354	1655375	129614	4137765	864721	38534			326995	15879359
1874	8921514	1758516	128596	3666239	1037729	77846			440872	16031313
1875	7928466	1764750	146502	4038268	1004967	57760			371858	15312571
1876	6925324	1679665	38937	4093425	889599	52921			341931	14021802
1877	7129089	1741900	82018	4002145	1265065	17966			583395	14821578
1878	6906027	2002245	85231	3503273	1009505	4903			1034718	14545903
1879	6682026	1888927	62111	3570091	1005157	12481			907483	14128276
1880	7702610	1976901	72450	4257245	1445452	28047		530746	581284	16594733
1881	7677329	2112967	51668	4122254	1079195	63250		571940	896998	16575603
1882	8108969	2072155	44827	3819754	1148721	50140		660942	613718	16519226
1883	7781969	2109833	42141	3566879	1093586	20880		767295	437627	15820209
1884	7513391	1975641	36426	3516279	982804	15320		780194	440498	15260552
1885	6183059	1657050	20920	2830993	994414	9406		656017	614005	12965864
1886	7010176	1479392	31994	2932946	1103768	9037		824322	509497	13901133
1887	6728159	1847420	22431	3146719	894515	485		852017	650151	14141897
1888	7370051	1641248	23741	3551247	1032777	14225		1125762	606064	15365114
1889	7566258	2146675	25222	4362133	1048543	35975		2670954	626525	18482286
1890	8652421	2729895	21795	4302199	1253064	8853		2853219	680459	20501904
1891	9611760	3240433	18595	5373079	1159362	3380		3045504	1043880	23495991
1892	9156623	3265293	13955	4155400	1273169	9660		2837182	836489	21547770
1893	9004356	2838037	12132	4814776	1391953	11049		3403982	790508	22266792
1894	8705665	3160230	156785	5453140	1130805	6716		3108874	502645	22224860
1895	8517971	3453700	141424	5316872	1412209	10408		4099859	959994	23912437

1896	7870355	3294782	107906	4859598	1247103	13200		3329843	1664708	22387496
1897	6420418	2880573	112370	3929954	945592	63926		2777415	756510	17886758
1898	7237342	3088243	80635	3909523	975744	59346		2491114	631484	18473430
1899	6235592	2781939	76261	4631520	968699	12104		2519452	476777	17702345
1900	6824936	2643058	48489	2918658	946805	11641		2479744	409001	16282333
1901	4894495	2635317	36134	2083855	796391	11512		1916987	648370	13023061
1902	6351957	2394952	34812	1910375	1012359	20140		2404519	675266	14804380
1903	6505287	2458161	72093	2060858	991174	5700		2832958	849047	15775279
1904	6922564	2519758	60455	2346449	1000787	19264		3080448	1001664	16951389
1905	7810518	2547569	65068	2451043	1330751	25297		3962341	1266045	19458633
1906	8988622	3383474	58544	3611188	1296948	30099		4913165	1606715	23888756
1907	11847725	4329276	92331	3739970	1335077			5730302	1486183	28560863
1908	9370972	4460222	97662	3045570	1028424	22330		4618644	1635663	24279488
1909	9534554	4005475	53104	3285933	1087027	16368		5004070	1511451	24497982
1910	18752403	5329330	87368	4226172	1480351	29990		6749066	2636223	39290903
1911	13790056	6402954	118357	4659769	1460641	40884		8507394	2366594	37346648
1912	14712216	8201955	215270	5010893	1536482	230913		10860417	4025776	44793920
1913	14278025	9913283	228682	4743992	1318334	66464		11071739	3084024	44704543

3.3. Official import prices and trading partner export prices of six import commodities, 1846-1913.

	Wheat flour		Coals		Cotton manufactures, printed and dyed		Cotton manufactures, plain		Codfish		Beef jerky	
	BRA, $/barrel	US, $/barrel	BRA, £/ton	UK, £/ton	BRA, £/yard	UK, £/yard	Morins, madapolões: blancos, £/yard	UK, £/yard	BR, £/cwt	RIO /UK, £/cwt	BRA, mil-réis/kg	RIO, mil-réis/kg
1846	6.5	5.7	1.3	1.8	0.02	0.02	0.01	0.01	0.6	0.8	0.1	0.2
1847	6.8	6.1	1.4	2.0	0.02	0.02	0.01	0.02	0.6	0.7	0.1	0.2
1848	6.1	6.6	1.3	1.7	0.02	0.02	0.01	0.01	0.5	0.7	0.1	0.1
1849	6.3	6.0	1.3	1.6	0.02	0.02		0.01	0.5	0.5	0.1	0.2
1850		5.6		1.6		0.02		0.01		0.6		0.2
1851		5.5		1.6		0.02		0.01		0.6		0.2
1852		4.8		1.6		0.02		0.01		0.6		0.2
1853		5.6		2.1		0.02		0.01		0.8		0.3
1854		7.7		2.2		0.02		0.01		0.8		0.3
1855		9.4		2.1		0.02		0.01		0.7		0.3
1856		9.3		2.0		0.02		0.01		0.9		0.4
1857		7.7		1.8		0.02		0.01		0.9		0.4
1858		6.8		1.6		0.02		0.01		0.8		0.4
1859		7.2		1.7		0.02		0.01		0.7		0.3
1860		7.1		1.8		0.02		0.01		0.7		0.2
1861		7.0		1.8		0.02		0.01		0.6		0.2
1862		6.6		1.7		0.02		0.02		0.8		0.2
1863		8.1		1.7		0.02		0.02		0.8		0.2
1864		8.4		1.9		0.03		0.03		0.7		0.2
1865		12.1		1.9		0.03		0.02		1.0		0.2
1866		10.9		1.8		0.03		0.02		0.9		0.2
1867		12.5		1.8		0.02		0.02		0.8		0.1
1868		11.4		1.7		0.02		0.02		0.7		0.1
1869		9.0		1.7		0.02		0.02		0.8		0.2
1870	3.2	7.0	1.9	1.7	0.02	0.02	0.01	0.02	0.5	1.3	0.2	0.2
1871	3.5	7.7	1.8	1.8	0.02	0.02	0.01	0.02	0.6	1.1	0.2	0.2
1872	3.7	8.3	1.8	2.3	0.01	0.02		0.02	0.5	1.1	0.2	0.2
1873		9.5		2.8		0.02		0.02		1.4		0.2
1874		8.6		2.4		0.02		0.02		1.2		0.3
1875		7.0		2.0		0.02		0.01		1.2		0.3
1876		7.2		1.8		0.02		0.01		1.1		0.3
1877		7.8		1.8		0.02		0.01		1.2		0.3
1878	3.3	7.2	1.9	1.7	0.02	0.02	0.01	0.01	0.5	1.0	0.2	0.3
1879	3.3	5.9	1.8	1.6	0.02	0.02	0.01	0.01	0.6	1.0	0.2	0.4
1880	3.9	6.9	1.9	1.7	0.01	0.02	0.01	0.01	0.9	0.8	0.2	0.3

1881	3.9	6.5	1.9	1.6	0.01	0.02	0.01	0.01	0.9	1.0	0.2	0.3
1882	3.8	7.3	1.8	1.7	0.02	0.02	0.01	0.01	0.9	1.0	0.2	0.3
1883		6.1		1.7		0.02		0.01		1.1		0.4
1884	3.7	5.9	1.7	1.6	0.02	0.02	0.01	0.01	0.9	1.0	0.2	0.3
1885	3.3	5.0	1.5	1.5	0.01	0.01	0.01	0.01	0.8	1.0	0.2	0.3
1886	3.4	4.9	1.6	1.4	0.01	0.01	0.01	0.01	0.8	1.0	0.2	0.3
1887	4.3	4.8	1.9	1.5	0.02	0.01	0.01	0.01	0.9	0.9	0.4	0.3
1888	4.9	4.8	2.1	1.9	0.02	0.01	0.01	0.01	1.3	1.1	0.4	0.3
1889		5.4		2.1		0.01		0.01		1.2		0.4
1890	4.3	4.8	1.9	2.0	0.02	0.01	0.01	0.01	1.2	1.0	0.3	0.3
1891	2.9	5.3	1.2	1.6	0.01	0.01	0.00	0.01	0.6	0.9	0.3	0.3
1892		5.4		1.5		0.01		0.01		1.1		0.3
1893		4.4		1.3		0.01		0.01		1.0		0.4
1894		3.8		1.4		0.01		0.01		0.9		0.3
1895		3.5		1.2		0.01		0.01		0.9		0.2
1896		4.0		1.3		0.01		0.01		0.8		0.3
1897		4.5		1.3		0.01		0.01		0.8		0.3
1898		5.1		1.5		0.01		0.01		0.8		0.3
1899		4.2		1.4		0.01		0.01		0.9		0.3
1900		4.0		1.9		0.01		0.01		1.1		0.3
1901	4.9	4.1	1.7	1.6	0.01	0.01	0.01	0.01	1.3	1.2	0.6	0.4
1902	5.2	4.0	1.5	1.4	0.01	0.01	0.01	0.01	2.2	1.0	0.5	0.3
1903	5.3	4.0	1.3	1.2	0.01	0.01	0.01	0.01	1.4	1.1	0.5	0.3
1904	6.6	4.8	1.3	1.2	0.01	0.01	0.01	0.01	1.0	1.4	0.5	0.3
1905	6.8	5.8	1.3	1.3	0.01	0.01	0.01	0.01	2.3	1.7	0.5	0.5
1906	5.8	4.9	1.0	1.4	0.01	0.01	0.01	0.01	1.5	1.3	0.5	0.5
1907	6.0	4.4	1.6	1.4	0.01	0.01	0.01	0.01	2.3	1.4	0.5	0.5
1908	6.8	5.3	1.5	1.3	0.01	0.01	0.01	0.01	2.2	1.3	0.5	0.5
1909	7.5	5.7	1.4	1.3	0.01	0.01	0.01	0.01	1.9	1.2	0.5	0.5
1910	6.9	5.9	1.6	1.6	0.01	0.01	0.01	0.01	1.7	1.6	0.5	0.5
1911	6.4	5.5	1.6	1.6	0.01	0.01	0.01	0.01	1.8	1.4	0.5	0.5
1912	6.6	5.2	1.9	1.8	0.01	0.01	0.01	0.01	1.7	1.5	0.6	0.8
1913	6.2	5.3	1.8	1.7	0.01	0.02	0.01	0.02	1.9	1.3	0.8	0.7

3.4. Total exports, corrected and official series, current prices, US dollars and British sterling, Brazil, 1821-1913.

	Corrected		Official	
	Sterling	Dollars	Sterling	Dollars
1821	3992039	19244823	4324000	20845139
1822	4397251	21888196	4030000	20060131
1823	5324439	25554647	4358000	20916221
1824	4756459	23151115	3851000	18743972
1825	5051293	24395220	4622000	22321949
1826	3664166	18029161	3319000	16330808
1827	4615356	22780474	3662000	18074900
1828	5155786	25409773	4142000	20413433
1829	4391021	21349143	3441000	16730142
1830	4676596	22268081	3348000	15941837
1831	4849295	23568061	3373000	16393117
1832	6027982	29282126	4677000	22719463
1833	8118696	38865821	6079000	29101389
1834	7562365	35075760	5480000	25417336
1835	8885785	43094279	6052000	29350990
1836	9160393	44128364	6126000	29510780
1837	7087605	36136154	4802500	24485546
1838	7435775	36333427	4496000	21968805
1839	8104504	40396899	5275500	26295730
1840	8720049	43602859	5536000	27681661
1841	8338722	41604383	5160000	25744788
1842	7566876	36299816	4760000	22834672
1843	7842962	37550532	4646000	22244119
1844	8318146	40422031	4824500	23444658
1845	8945055	43574048	5313000	25881217
1846	9216461	44385555	5785000	27859982
1847	9742514	46699766	6322500	30306272
1848	8372358	40760824	6312500	30732406
1849	8615294	41473164	5898500	28394789
1850	10826102	52725280	7026500	34220460
1851	10158828	49907272	8102000	39802695
1852	10619190	52053145	8250500	40442301
1853	11869461	58014362	8769500	42862685
1854	12327214	60188857	9780000	47751828
1855	13381291	65383662	10640000	51989168
1856	14229477	69851078	11995500	58884710
1857	15020791	73430638	11909500	58220782
1858	12296885	59732118	11020500	53532079
1859	14060570	68744937	11582500	56629159

1860	15592594	75613166	12517000	60698688
1861	15283306	74113334	13049000	63278516
1862	16745363	81203290	13140500	63722227
1863	16658694	80783003	14158000	68656389
1864	19403825	94094966	15312500	74254906
1865	19622053	95153220	16051500	77838539
1866	19912794	96563111	16078000	77967045
1867	19517299	94645239	16556000	80285011
1868	20618179	99983735	15838500	76805638
1869	20122427	97579686	14902000	72264269
1870	19926969	96631850	15446000	74902288
1871	23021259	111636989	17264000	83718315
1872	27666967	134165422	20740500	100576907
1873	25311086	122741048	21506000	104289046
1874	26639788	129184326	21506000	104289046
1875	26260275	127343950	21606000	104773976
1876	23573242	114313724	20696500	100363537
1877	27469958	133210068	19818000	96103427
1878	28484990	138132263	19285500	93521175
1879	22899803	111144193	19648500	95363995
1880	23847624	115529814	20519000	99404296
1881	24763859	119597055	20193500	97524508
1882	26651016	129785119	18258000	88912808
1883	27439695	133055082	18435500	89393740
1884	25289079	122748132	19498500	94641819
1885	23452261	113884180	17307000	84042792
1886	23838395	115887972	17806000	86562088
1887	27380770	132846022	21954000	106516417
1888	22184701	108046150	21714000	105753694
1889	33164431	161467663	28552000	139011122
1890	29910918	145382015	26382000	128229711
1891	32828939	159584758	27136000	131910810
1892	38636345	188278775	30854000	150354627
1893	32437691	157773686	32007000	155678847
1894	33210631	161964924	30491000	148701558
1895	40912773	199993909	32586000	159290144
1896	43106203	209978937	28333000	138015710
1897	46603278	226645721	25883000	125876794
1898	33030315	160121058	25019000	121284606
1899	28916534	140644237	25545000	124245771
1900	32396501	157615459	33163000	161344628
1901	48851166	238037077	40622000	197938819
1902	42870088	208858781	36437000	177517420
1903	47194129	229509766	36883000	179365717
1904	41587285	202430269	39430000	191929468

1905	48962164	238210722	44643000	217197124
1906	52864478	256435011	53059000	257378597
1907	54702252	265738071	54177000	263186448
1908	48194210	234493747	44155000	214840568
1909	64271161	313186941	63724000	310520680
1910	51191823	248945835	63092000	306816396
1911	60574413	294530968	66839000	324991270
1912	74424514	362134799	74649000	363227104
1913	74527019	362477061	65451000	318334029

Exports by commodity, corrected, British sterling, current prices

	Cacao	Coffee	Cotton	Hides	Rubber	Sugar	Other
1821	64812	830068	654029	513781		1028279	901071
1822	37226	1143920	657826	645029		999976	913275
1823	39524	1467696	647951	448113		1567812	1153343
1824	76783	1143249	686470	415147		1296028	1138784
1825	96622	904420	1220083	547486		1297996	984685
1826	87334	1093803	209363	584850		1018690	670126
1827	87987	1372161	428378	515408		1698464	512957
1828	31292	1345951	626730	424122		2199913	527777
1829	54892	1287152	543163	583528		1566257	356029
1830	28284	1291202	805696	502699		1684142	364573
1831	25733	1491365	615825	664445		1564553	487374
1832	56838	2223642	502659	644492		2022943	577408
1833	51799	3556772	854754	655942		2180747	818681
1834	34710	3160757	774926	574708		1956048	1061215
1835	45361	3071653	929506	644038		2655043	1540183
1836	45860	2911695	895504	665497		3018657	1623181
1837	72960	2688723	518777	368185		2445735	993224
1838	104918	3260601	450432	271749		2521144	826932
1839	100594	3671324	535549	476226		2388304	932506
1840	115816	3449761	393726	527653		3238384	994709
1841	125655	3405751	420554	567450		2710714	1108597
1842	129602	3217831	350540	608607		2105393	1154902
1843	106192	3029665	347403	741485		2394337	1223880
1844	101056	2879515	415397	899959		2822212	1200006
1845	100049	2888712	299811	958297		3491032	1207153
1846	126390	3442393	329077	990361		3140535	1187705
1847	114137	4060455	419661	850888		2781870	1515502
1848	123945	3349642	322790	710540		2288454	1576987
1849	167344	3341172	511272	606028		2596804	1392673
1850	136792	4873568	849705	674099	132343	2899867	1259727

1851	135738	4724421	566626	841237	173054	2419393	1298359
1852	110848	5074591	585860	851091	188252	2336445	1472102
1853	121789	5367745	642392	1064193	232248	2687090	1754004
1854	105073	6494082	635895	921964	549591	2058315	1562295
1855	77308	6990550	673802	904869	349399	2604949	1780414
1856	105691	7271934	805749	1223398	235037	2676213	1911455
1857	241092	7013134	998885	1178349	182102	3360081	2047147
1858	173626	5455315	1001938	893348	164127	2980095	1628436
1859	153861	7029982	913173	1094658	391281	2639477	1838138
1860	162048	9493960	640225	1108866	534443	1729079	1923972
1861	162853	8660301	840414	1104289	326387	2098041	2091020
1862	157810	7843335	2037497	1049203	422011	2697244	2538263
1863	147490	7518520	3250915	958540	495980	2143464	2143784
1864	125961	7924609	5168650	1075048	477938	2313504	2318114
1865	100953	8329097	5299122	958608	485114	2191720	2257438
1866	137234	8119974	5669535	963029	755685	1825184	2442153
1867	150894	9057482	3682435	975726	817887	1908454	2924422
1868	123420	9634590	3475445	1103531	817880	1823260	3640051
1869	129434	8741189	4026259	1077907	926864	2075081	3145693
1870	155753	9244721	3615743	1092222	1166059	2470706	2181765
1871	168150	10939447	3976158	1056763	1300055	3059645	2521042
1872	208629	13449732	4560861	1273906	1325588	4138614	2709636
1873	160350	13375590	3741303	1363830	1411328	3340474	1918211
1874	204573	15254042	3222649	1328611	1393343	3319450	1917120
1875	214317	16136143	2168104	1336901	1287426	3020484	2096900
1876	247657	14700028	1554868	1030473	1272619	2685871	2081726
1877	304052	15967927	1209147	1034368	1280317	4181388	3492758
1878	371082	18459026	1059142	984601	1156550	2860318	3594272
1879	378061	13483414	869326	1174661	1541695	3071358	2381288
1880	362535	12314111	622354	1215076	2113592	3577646	3642310
1881	368367	12326134	877887	1128383	2026745	3951680	4084661
1882	362655	15112752	1509864	754588	2611522	3859171	2440464
1883	427221	16868844	1574066	578514	3207776	4234288	548986
1884	429920	15539320	1455937	628385	2260561	3971679	1003278
1885	358778	15304686	982641	790232	1904842	2187162	1923919
1886	383424	15970406	875204	741184	2261529	1977001	1629647
1887	369617	18060169	1195999	631816	2845480	2070187	2207503
1888	641413	11525576	974475	709637	4717096	1819994	1796509
1889	559755	23132692	624912	911872	4212611	1371682	2350905
1890	374417	20909888	604900	854973	4358378	1440992	1367371
1891	635849	22733485	903880	904169	4441278	1987931	1222348
1892	353674	29047187	490017	806662	3851361	1777833	2309612
1893	628107	22788236	1562901	659435	4355656	1241873	1201484
1894	535012	23496121	941066	623183	4312533	1578601	1724115
1895	679105	28851859	321939	948162	6279065	1267537	2565106

1896	625746	30944315	261107	1050757	5784228	1500249	2939801
1897	578489	31655265	392684	1174466	5202552	1012601	6587220
1898	641416	18909977	238454	1390811	4577050	1073231	6199376
1899	643946	16550202	114803	1391789	5706592	460841	4048361
1900	1080798	18794364	836857	1106829	6950025	863639	2763989
1901	1077668	29257329	528957	1153638	9723436	1532914	5577223
1902	1262131	24429426	1344208	1449936	8496195	804553	5083639
1903	1169855	25478358	1607228	1571668	10829318	156873	6380829
1904	1305787	21396382	844252	2086422	12679530	56598	3218315
1905	1035987	23548420	1550248	1922585	15811381	324318	4769227
1906	1313627	27563317	1805417	2477896	15807941	456476	3439804
1907	2232447	28323346	1784235	2629813	15453483	188314	4090613
1908	2198520	24798030	209209	2576616	13136110	288545	4987180
1909	1689472	33459849	657380	3034038	21137434	626420	3666568
1910	1481591	19869611	995555	3024126	24446507	657817	716616
1911	1826233	35627185	962819	2852365	17799280	310722	1195810
1912	1666626	45397727	1034246	3636983	18269814	58493	4360625
1913	1883418	45448886	2264900	5154108	11244530	48626	8482550

3.5. New freight rate series for selected export commodities, Brazil, 1821-1850.

	Coffee	Sugar	Cotton	Hides
	£ per ton	£ per ton	£ per lb	£ per ton
1821	3.9	3.4	11.0	4.6
1822	3.9	3.4	10.7	4.6
1823	3.8	3.3	10.3	4.5
1824	3.4	2.6	8.3	3.6
1825	3.4	2.6	8.3	3.6
1826	3.3	2.6	8.3	3.6
1827	3.6	2.3	7.4	3.2
1828	3.3	2.3	7.1	3.1
1829	3.2	3.1	4.2	3.1
1830	3.3	4.1	4.3	3.1
1831	3.6	3.8	4.8	3.1
1832	2.7	3.6	4.5	2.9
1833	2.7	3.5	4.3	2.8
1834	2.6	2.9	6.3	2.6
1835	2.4	2.6	6.3	2.5
1836	2.9	2.5	6.0	2.4
1837	2.8	3.6	6.5	3.5
1838	3.0	4.1	6.2	4.3
1839	2.3	3.3	5.9	3.3
1840	2.6	3.1	6.1	3.5
1841	2.3	2.9	5.5	3.2
1842	2.4	2.4	4.4	3.1
1843	1.9	2.3	4.3	3.0
1844	2.2	2.7	6.9	3.0
1845	2.1	2.2	6.9	3.0
1846	2.3	2.4	5.0	3.0
1847	3.4	3.1	5.9	4.3
1848	2.5	2.9	5.6	2.8
1849	1.9	1.9	5.1	2.8
1850	1.8	1.7	5.5	2.8
1851	2.5	2.3	3.3	2.3
1852	1.8	2.1	3.3	2.1
1853	3.1	2.5	3.3	2.5
1854	3.3	2.5	3.3	2.5
1855	2.9	2.2	3.3	2.2
1856	2.7	2.6	3.3	2.6
1857	2.1	2.4	3.3	2.4
1858	2.3	2.4	3.0	2.4
1859	1.7	2.0	3.5	2.0
1860	1.7	2.0	3.5	2.0

1861	2.1	2.1	3.5	2.1
1862	2.5	2.4	3.5	2.4
1863	1.8	2.5	3.5	2.5
1864	2.5	2.5	3.5	2.5
1865	2.7	2.5	3.5	2.5
1866	2.3	2.5	3.5	2.5
1867	2.1	2.5	3.5	2.5
1868	2.1	2.5	3.5	2.5
1869	2.0	2.4	3.8	2.4
1870	1.7	2.3	3.6	2.3
1871	2.1	2.2	3.9	2.2
1872	2.2	2.2	9.7	2.2
1873	2.3	2.4	4.5	2.4
1874	2.2	2.0	4.1	2.0
1875	2.2	2.2	4.3	2.2
1876	2.1	1.6	3.7	1.6
1877	1.9	2.3	3.7	2.3
1878	1.8	1.8	3.7	1.8
1879	1.9	1.9	3.6	1.9
1880	2.3	1.8	3.2	1.8
1881	2.8	2.5	3.0	2.5
1882	2.2	2.4	3.4	2.4
1883	1.8	2.0	3.0	2.0
1884	1.6	1.9	2.8	1.9
1885	1.8	1.6	2.6	1.6
1886	1.6	1.6	2.5	1.6
1887	1.7	1.6	2.5	1.6
1888	1.6	1.4	3.0	1.4
1889	1.2	1.5	3.1	1.5
1890	1.4	2.0	2.3	2.0
1891	1.8	1.5	2.5	1.5
1892	2.0	1.8	2.1	1.8
1893	1.7	1.5	2.3	1.5
1894	1.8	1.8	2.4	1.8
1895	1.6	1.4	2.1	1.4
1896	1.4	1.2	2.1	1.2
1897	1.3	1.2	2.0	1.2
1898	1.5	1.5	3.0	1.5
1899	1.5	1.7	4.9	1.7
1900	1.6	1.9	3.9	1.9
1901	1.6	1.7	3.1	1.7
1902	1.3	1.4	3.4	1.4
1903	1.3	1.4	3.3	1.4
1904	1.4	1.4	2.1	1.4
1905	1.7	1.1	2.4	1.1

1906	1.8	1.1	2.7	1.1
1907	1.6	1.1	2.4	1.1
1908	1.8	1.0	2.3	1.0
1909	1.9	0.9	2.3	0.9
1910	1.9	0.9	2.3	0.9
1911	2.2	0.9	2.6	0.9
1912	2.1	1.7	3.3	1.7
1913	2.3	1.5	3.2	1.5

Export tax and insurance rate series, % of value, 1821-1913

	Average export tax		Insurance
	Revenue/Export value	Ad hoc upper bound	
1821	2.4	17.4	2.5
1822	2.4	17.4	2.9
1823	2.4	17.4	5.6
1824	2.8	17.8	2.9
1825	2.7	17.7	2.9
1826	3.6	18.6	2.9
1827	3.6	18.6	2.8
1828	1.7	16.7	2.5
1829	3.7	18.7	2.0
1830	4.9	19.9	1.8
1831	2.3	17.3	2.3
1832	3.6	18.6	2.7
1833	2.1	17.1	2.0
1834	2.2	17.2	1.7
1835	2.1	17.1	1.7
1836	6.6	21.6	1.7
1837	7.0	22.0	1.7
1838	6.9	21.9	1.6
1839	7.2	22.2	1.7
1840	7.1	22.1	1.7
1841	7.2	22.2	1.6
1842	7.0	22.0	1.7
1843	7.1	22.1	1.7
1844	7.4	22.4	1.5
1845	7.7	22.7	1.6
1846	7.6	22.6	1.6
1847	7.1	22.1	1.6
1848	6.8	21.8	1.6
1849	6.9	21.9	1.6

1850	7.0	22.0	1.6
1851	6.8	21.8	1.6
1852	6.1	21.1	1.6
1853	5.0	20.0	1.6
1854	4.6	19.6	1.6
1855	4.9	19.9	1.6
1856	6.0	21.0	1.6
1857	6.4	21.4	1.6
1858	6.9	21.9	1.6
1859	4.9	19.9	1.6
1860	5.9	20.9	1.6
1861	6.8	21.8	1.6
1862	6.8	21.8	1.6
1863	6.9	21.9	1.7
1864	6.8	21.8	1.8
1865	7.0	22.0	1.5
1866	6.9	21.9	1.6
1867	8.3	23.3	1.7
1868	9.2	24.2	1.7
1869	9.1	24.1	1.7
1870	8.9	23.9	1.6
1871	9.0	24.0	1.6
1872	9.0	24.0	1.6
1873	9.1	24.1	1.5
1874	9.0	24.0	1.5
1875	8.8	23.8	1.5
1876	8.3	23.3	1.5
1877	8.7	23.7	1.4
1878	8.9	23.9	1.4
1879	8.3	23.3	1.4
1880	8.8	23.8	1.3
1881	9.2	24.2	1.3
1882	8.4	23.4	1.3
1883	7.7	22.7	1.3
1884	7.4	22.4	1.2
1885	7.8	22.8	1.2
1886	10.4	25.4	1.2
1887	12.2	27.2	1.2
1888	8.4	23.4	1.2
1889	7.7	22.7	1.2
1890	6.0	21.0	1.2
1891	9.9	9.9	1.2
1892	9.7	9.7	1.2

1893	10.0	10.0	1.2
1894	9.7	9.7	1.2
1895	9.4	9.4	1.2
1896	9.5	9.5	1.2
1897	9.5	9.5	1.2
1898	9.6	9.6	1.2
1899	10.3	10.3	1.2
1900	10.0	10.0	1.2
1901	10.2	10.2	1.2
1902	11.2	11.2	1.2
1903	11.3	11.3	1.2
1904	11.1	11.1	1.2
1905	11.1	11.1	1.2
1906	12.3	12.3	1.2
1907	12.2	12.2	1.2
1908	12.1	12.1	1.2
1909	12.3	12.3	1.2
1910	11.5	11.5	1.3
1911	11.2	11.2	1.3
1912	11.2	11.2	1.4
1913	11.2	11.2	1.8

3.6. Total exports, under alternative trade cost assumptions, current prices, US dollars and British sterling, 1821-1913.

	New freight series, high taxes		New freight series, no taxes	
	Sterling	Dollars	Sterling	Dollars
1821	3467829	16717708	4120534	19864269
1822	3831787	19073486	4537781	22587711
1823	4490222	21550822	5408005	25955722
1824	4104672	19978669	4949653	24091444
1825	4380300	21154657	5240943	25311136
1826	3212909	15808796	3834529	18867414
1827	3968420	19587326	4812415	23753118
1828	4382544	21598930	5239820	25823930
1829	3781203	18384211	4578914	22262681
1830	3899436	18567555	4841141	23051579
1831	4128363	20064259	4934238	23980889
1832	5094273	24746451	6198181	30108904
1833	6935264	33200497	8317612	39818074
1834	6465959	29990411	7763714	36009660
1835	7585950	36790339	9090262	44085953
1836	7713496	37158226	9759502	47014447
1837	5790496	29522844	7476026	38116516
1838	6019674	29413935	7818112	38201640
1839	6725507	33523290	8644513	43088573
1840	7169900	35851650	9214317	46074349
1841	6896586	34409136	8836992	44090406
1842	6320328	30319879	8038600	38562770
1843	6626977	31728640	8397663	40206330
1844	6915080	33603831	8788744	42708901
1845	7506133	36564628	9558313	46561408
1846	8056271	38798193	10287137	49541821
1847	8263759	39611501	10641248	51007759
1848	7385232	35955004	9437261	45945306
1849	7448807	35857810	9502226	45742766
1850	9653194	47012987	12298170	59894546
1851	8713040	42804554	10928415	53688026
1852	9187789	45036706	11468683	56217189
1853	10329525	50487619	12655355	61855577
1854	10359115	50579415	13436605	65605569
1855	11777916	57549255	15070236	73636188
1856	12311719	60436999	15716145	77148983
1857	13126409	64169761	16599278	81147229

1858	10632130	51645572	13861889	67334128
1859	12001014	58675359	15412618	75355370
1860	13579503	65851086	16993838	82408219
1861	13292015	64456967	16947144	82181788
1862	13746087	66658900	18145939	87995102
1863	13758180	66717544	17991688	87247090
1864	16001886	77597944	21068937	102169597
1865	16198649	78552108	21421694	103880223
1866	16428477	79666612	21670100	105084817
1867	16259390	78846661	21557740	104539949
1868	17016440	82517823	23006075	111563359
1869	16423963	79644725	22484528	109034220
1870	16279841	78945835	22149980	107411900
1871	18803069	91181724	25673618	124499075
1872	22475842	108992099	31062430	150631041
1873	20694152	100352153	28151272	136513964
1874	21777333	105604822	29502616	143067036
1875	21451439	104024465	29060297	140922100
1876	19266227	93427717	25950099	125839816
1877	22502813	109122893	29944126	145208048
1878	23402756	113486983	31264946	151613101
1879	18641491	90476478	25207582	122344998
1880	19513297	94532167	26280816	127317415
1881	20098494	97065676	27620289	133392187
1882	21496880	104685506	29458905	143458975
1883	22282378	108047252	29899232	144981378
1884	20649401	100228063	27442330	133199583
1885	19337776	93904238	25737956	124983515
1886	19631689	95437492	26136722	127061058
1887	21750633	105529722	29965652	145387350
1888	17091997	83243153	24044677	117104791
1889	26980243	131358708	35673897	173685502
1890	24620948	119670120	32335177	157165130
1891	27424212	133311839	35245710	171332920
1892	42924400	209174892	43668377	212800370
1893	36083030	175504248	36547684	177764279
1894	37025949	180571849	37594026	183342307
1895	45673983	223268133	46297206	226314634
1896	48002278	233828696	48527138	236385393
1897	52058402	253175624	53034201	257921230
1898	36490654	176895743	37438874	181492428
1899	32241338	156815419	33508931	162980740
1900	36149816	175876087	36796814	179023861
1901	48678043	237193500	50252856	244867091
1902	42647031	207772072	44164532	215165182

1903	46910282	228129393	48486734	235795836
1904	41195296	200522223	42559150	207160917
1905	48588184	236391232	50717122	246748942
1906	52425441	254305329	54619387	264947721
1907	54192245	263260506	55017290	267268494
1908	47683940	232010977	51126772	248762423
1909	63666315	310239584	67562520	329225402
1910	50455029	245362805	52848427	257001903
1911	60091705	292183897	62242522	302641816
1912	73826573	359225341	76046486	370026991
1913	73516487	357562139	75961735	369455089

3.7. Export price indices (1913=100), Brazil, 1821-1913.

	New index	Gonçalves	Blattman, Hwang and Williamson
1821	155		
1822	149		
1823	159		
1824	127		
1825	140		
1826	112		
1827	114		
1828	112		
1829	99		
1830	96		
1831	93		
1832	103		
1833	108		
1834	106		
1835	112		
1836	115		
1837	95		
1838	96		
1839	98		
1840	102		
1841	97		
1842	85		
1843	80		
1844	78		
1845	79		
1846	74		
1847	69		
1848	58		
1849	69		
1850	81	71	
1851	67	73	
1852	68	76	
1853	76	71	
1854	76	87	
1855	76	80	
1856	81	91	
1857	91	103	
1858	76	102	
1859	87	89	
1860	95	108	126
1861	87	104	118

1862	103	105	131
1863	110	114	147
1864	118	136	155
1865	105	116	132
1866	97	107	117
1867	86	92	105
1868	84	90	97
1869	86	74	106
1870	87	85	106
1871	88	80	122
1872	106	82	148
1873	114	112	165
1874	118	118	160
1875	115	106	152
1876	108	115	144
1877	115	103	151
1878	109	92	124
1879	97	84	120
1880	107	113	126
1881	94	95	109
1882	88	78	94
1883	87	59	98
1884	79	69	95
1885	75	65	83
1886	79	58	90
1887	95	71	135
1888	88	101	116
1889	105	103	134
1890	103	102	142
1891	103	96	128
1892	100	92	116
1893	104	116	134
1894	100	106	123
1895	101	97	122
1896	108	74	102
1897	86	63	79
1898	60	60	69
1899	56	64	71
1900	65	79	83
1901	64	67	72
1902	59	62	63
1903	66	65	67
1904	74	80	81
1905	78	84	87
1906	71	84	85

1907	72	81	72
1908	69	75	67
1909	77	90	84
1910	90	117	101
1911	100	118	112
1912	111	123	123
1913	100	100	100

Export price indices, corrected, by commodity (1913=100)

	Cacao	Coffee	Cotton	Hides	Rubber	Sugar
1821	101	188	102	53		323
1822	86	180	84	60		301
1823	87	190	85	62		323
1824	97	122	94	59		318
1825	99	118	131	62		404
1826	85	100	68	57		318
1827	70	93	70	63		372
1828	74	87	76	68		359
1829	71	82	66	53		314
1830	68	79	82	52		284
1831	47	79	65	56		274
1832	56	91	80	53		294
1833	59	93	104	53		328
1834	54	88	108	51		338
1835	66	89	124	45		380
1836	57	87	114	45		428
1837	58	76	73	43		331
1838	58	77	73	45		353
1839	54	79	90	49		353
1840	62	77	64	54		398
1841	71	76	71	50		352
1842	84	67	60	45		314
1843	67	59	53	43		331
1844	67	55	58	43		323
1845	65	52	46	42		360
1846	67	49	59	42		332
1847	67	50	76	39		281
1848	65	44	49	34		211
1849	68	55	57	33		238
1850	54	72	92	36	38	258
1851	53	57	71	43	38	220
1852	46	62	69	46	38	192

1853	48	69	76	54	38	215
1854	49	71	81	46	68	190
1855	53	68	80	47	45	250
1856	56	70	86	63	40	266
1857	107	74	107	64	36	339
1858	71	62	104	51	32	250
1859	66	78	107	62	59	236
1860	77	91	104	59	69	246
1861	80	84	127	52	44	210
1862	73	101	234	47	51	199
1863	64	106	301	41	49	198
1864	60	100	378	43	46	252
1865	55	96	258	38	46	203
1866	79	85	228	37	59	185
1867	70	79	150	40	54	200
1868	58	76	142	44	55	213
1869	55	74	162	40	63	226
1870	54	78	136	42	76	215
1871	53	81	106	43	78	234
1872	67	104	121	47	79	248
1873	57	125	121	50	77	210
1874	65	134	107	52	72	203
1875	64	130	100	51	72	203
1876	71	123	88	41	69	195
1877	92	126	82	48	64	261
1878	121	123	81	44	57	199
1879	119	105	78	42	74	187
1880	97	115	85	45	100	209
1881	81	93	84	47	96	214
1882	80	82	90	42	117	200
1883	98	82	79	45	124	184
1884	103	79	84	45	85	145
1885	109	77	83	42	76	125
1886	109	81	75	39	87	129
1887	92	111	72	39	83	110
1888	100	98	73	33	89	127
1889	98	121	76	36	85	144
1890	95	119	78	35	91	119
1891	100	124	74	33	86	119
1892	86	119	68	28	68	121
1893	99	125	66	31	74	132
1894	100	123	57	28	71	114
1895	102	125	56	39	73	86
1896	110	134	60	37	76	96
1897	87	98	56	37	78	88

1898	90	60	49	42	70	94
1899	80	49	51	39	88	101
1900	111	60	67	37	92	103
1901	109	58	74	42	104	90
1902	97	54	69	44	96	65
1903	88	58	94	45	110	79
1904	89	62	105	51	128	80
1905	78	64	106	58	144	95
1906	83	58	94	62	146	59
1907	145	53	105	67	136	162
1908	105	57	97	66	111	101
1909	79	58	109	67	175	101
1910	80	60	147	72	204	124
1911	82	92	109	72	157	95
1912	86	110	102	80	139	135
1913	100	100	100	100	100	100

Corrected export prices, f.o.b. (new freight series and high export tax assumption), pounds sterling per metric ton, by commodity

	Cacao	Coffee	Cotton	Hides	Rubber	Sugar
1821	57.1	93.9	50.3	64.2		23.3
1822	48.9	89.6	41.0	72.2		21.5
1823	48.5	93.5	41.5	72.9		23.0
1824	53.9	60.8	48.0	70.9		23.2
1825	54.9	59.0	66.1	74.7		29.8
1826	47.3	50.0	34.3	68.0		23.0
1827	38.3	46.0	34.7	75.0		27.3
1828	41.1	43.4	36.5	81.0		26.6
1829	39.4	40.9	34.8	63.3		22.2
1830	37.8	39.1	42.2	62.1		18.9
1831	26.2	39.1	35.2	66.2		18.4
1832	31.5	45.1	40.8	63.2		20.1
1833	32.7	46.1	54.5	63.4		22.8
1834	30.0	43.9	54.3	60.8		24.0
1835	36.4	44.0	62.0	53.9		27.5
1836	30.6	42.0	56.2	53.3		31.0
1837	31.1	37.0	36.4	50.0		22.5
1838	30.8	36.8	38.1	51.6		23.6
1839	29.1	38.4	44.7	56.1		24.4
1840	33.0	36.9	32.0	61.3		27.8
1841	37.8	36.9	34.8	57.1		24.5

1842	44.5	32.2	29.8	51.3		22.1
1843	36.1	29.0	26.4	49.5		23.5
1844	36.1	26.6	26.2	49.5		22.5
1845	34.8	25.3	20.5	48.4		25.8
1846	35.7	25.5	28.6	45.8		24.6
1847	34.6	24.7	37.2	40.9		20.6
1848	34.3	22.7	23.3	41.7		15.4
1849	35.5	26.6	24.4	38.6		18.9
1850	35.8	35.5	46.8	42.4	87.6	21.5
1851	40.5	27.0	35.6	52.9	87.0	16.6
1852	30.7	29.5	34.6	60.5	89.2	14.5
1853	34.4	32.6	38.3	71.5	88.9	16.2
1854	28.8	31.9	45.4	62.8	177.4	14.3
1855	31.0	32.9	43.0	70.8	117.9	18.1
1856	29.9	33.6	45.1	85.1	105.9	19.2
1857	56.6	35.1	54.1	101.7	94.2	24.1
1858	37.5	29.7	52.9	80.4	83.0	17.7
1859	34.3	36.7	52.6	90.8	150.9	16.6
1860	41.1	43.7	52.9	85.3	181.3	17.7
1861	42.4	40.4	65.0	77.0	116.1	14.9
1862	38.2	47.7	118.4	44.9	132.2	13.9
1863	33.6	50.6	152.3	38.9	128.4	13.8
1864	31.4	47.2	191.3	41.2	118.2	17.7
1865	28.8	45.4	130.5	35.9	119.2	14.2
1866	41.5	40.2	115.2	35.4	154.2	12.9
1867	37.6	37.7	76.8	38.6	143.7	14.0
1868	30.9	36.3	71.9	41.9	143.3	14.7
1869	28.9	34.8	80.9	37.9	163.4	15.4
1870	28.5	36.8	68.0	40.2	197.8	14.7
1871	27.7	38.3	53.2	40.5	202.2	16.0
1872	34.9	49.2	59.6	44.6	205.3	16.9
1873	29.6	59.1	60.4	47.9	200.0	14.3
1874	33.9	63.7	53.2	49.8	185.0	13.8
1875	32.2	61.5	48.9	48.7	177.6	13.8
1876	35.7	58.4	42.8	38.7	170.9	13.3
1877	46.5	60.0	40.4	46.0	160.9	18.0
1878	61.1	58.6	39.5	41.7	141.5	13.6
1879	60.0	49.4	38.0	40.3	184.9	12.8
1880	49.2	54.5	42.1	43.5	250.3	14.4
1881	40.7	44.0	41.0	44.8	239.0	14.6
1882	40.1	38.5	42.7	39.5	290.0	13.6
1883	49.9	38.7	37.7	43.0	310.4	12.6
1884	52.8	37.2	41.0	43.4	224.9	10.0
1885	55.9	36.4	40.3	41.1	193.1	8.7
1886	55.6	38.5	36.7	37.7	218.3	8.9

1887	45.5	51.1	33.6	36.6	202.4	7.3
1888	48.3	43.5	33.1	30.0	211.5	8.2
1889	49.7	56.4	36.5	33.6	212.1	9.8
1890	48.6	56.5	38.2	32.8	249.1	8.2
1891	52.1	59.2	37.3	33.1	246.2	8.3
1892	60.9	76.4	43.9	32.6	240.9	11.0
1893	68.0	80.5	42.8	35.7	261.6	12.0
1894	68.9	79.0	37.7	32.5	249.5	10.4
1895	68.8	80.6	37.0	44.7	258.4	7.8
1896	72.8	86.0	39.6	42.9	272.4	8.7
1897	57.6	62.8	37.3	42.9	278.4	8.0
1898	59.3	38.1	32.4	48.0	250.6	8.5
1899	52.5	31.9	33.8	44.6	318.5	9.2
1900	73.3	38.6	44.2	44.5	329.0	9.4
1901	68.7	33.0	45.0	43.4	289.3	8.2
1902	61.1	30.9	41.8	45.1	266.3	5.9
1903	56.0	32.8	56.9	45.4	303.2	7.2
1904	56.4	35.6	63.7	51.3	352.7	7.2
1905	49.1	36.3	64.4	58.7	397.0	8.6
1906	52.3	32.9	57.0	62.7	401.8	5.4
1907	91.5	30.1	63.6	66.9	371.3	14.6
1908	66.7	32.7	58.7	66.5	301.7	9.1
1909	50.0	33.0	65.9	67.1	475.8	9.1
1910	50.8	34.1	89.2	72.1	547.6	11.2
1911	52.2	52.7	65.7	72.8	430.8	8.6
1912	54.7	62.6	61.7	81.7	383.3	12.3
1913	63.3	57.1	56.3	101.6	275.3	9.1

3.8. Import price indices (1913=100), Brazil, 1827-1913.

	New series	Imlah	Gonçalves
1827	164	180	
1828	165	176	
1829	161	159	
1830	162	163	
1831	150	157	
1832	125	144	
1833	132	146	
1834	126	151	
1835	135	158	
1836	136	165	
1837	127	152	
1838	124	144	
1839	124	142	
1840	115	133	
1841	111	128	
1842	104	118	
1843	94	116	
1844	94	119	
1845	97	122	
1846	96	120	
1847	105	122	
1848	94	109	
1849	90	104	
1850	93	104	80
1851	91	102	78
1852	89	101	77
1853	95	112	80
1854	96	112	76
1855	100	109	73
1856	100	112	74
1857	102	115	81
1858	97	113	80
1859	99	115	80
1860	98	114	78
1861	97	115	79
1862	104	121	90
1863	130	133	107
1864	144	146	120
1865	147	139	113
1866	144	144	115
1867	129	135	99

1868	118	126	89
1869	113	125	90
1870	109	122	96
1871	115	122	89
1872	123	135	98
1873	132	140	101
1874	123	132	96
1875	116	124	92
1876	109	114	83
1877	105	110	79
1878	98	106	75
1879	94	99	69
1880	97	103	76
1881	96	99	71
1882	97	101	72
1883	94	97	69
1884	86	94	68
1885	80	90	63
1886	77	86	61
1887	80	86	64
1888	83	86	65
1889	90	87	68
1890	86	91	69
1891	79	90	69
1892	74	86	65
1893	77	86	69
1894	70	82	69
1895	64	79	65
1896	69	79	65
1897	67	78	61
1898	71	79	61
1899	69	82	68
1900	80	95	82
1901	78	90	78
1902	72	86	72
1903	71	86	73
1904	74	87	74
1905	82	87	75
1906	80	92	83
1907	82	96	88
1908	83	93	85
1909	82	89	80
1910	91	93	87
1911	90	95	89
1912	100	96	92

1913	100	100	100

Import prices, adjusted (c.i.f.), by commodity, 1827-1913

Product:	Beef, salted or cured	Candles	Bacalhao	Wheat flour	Charque	Cement	Lard	Iron bars
Origen:	US	US	UK, Rio current prices	US	Rio de la Plata	UK	US	UK
Unit:	s/lb	s/lb	s/cwt	s/kg	s/kg	s/ton	s/lb	s/ton
1827	0.17	1.32	17.65	0.27	0.52			152.50
1828	0.18	1.18	14.63	0.27	0.56			123.38
1829	0.22	1.08	8.73	0.35	0.37			108.42
1830	0.21	1.08	10.92	0.29	0.31			96.19
1831	0.19	1.21	11.57	0.30	0.30			105.84
1832	0.19	1.34	11.57	0.32	0.44			151.99
1833	0.19	1.49	11.18	0.32	0.36			118.68
1834	0.23	1.47	15.58	0.32	0.36			129.54
1835	0.21	1.41	15.37	0.32	0.34			189.42
1836	0.21	1.51	14.97	0.38	0.49			174.93
1837	0.24	1.39	10.67	0.48	0.33			117.90
1838	0.32	1.38	15.76	0.43	0.39			136.34
1839	0.30	1.57	15.40	0.40	0.31			162.15
1840	0.31	1.65	14.90	0.30	0.38			160.29
1841	0.23	1.61	13.25	0.29	0.32			153.41
1842	0.19	1.47	9.96	0.33	0.22			124.58
1843	0.17	1.08	13.52	0.26	0.44			98.62
1844	0.19	1.21	13.13	0.27	0.35			97.03
1845	0.18	1.24	12.32	0.27	0.38			150.67
1846	0.19	1.12	16.39	0.30	0.36			165.35
1847	0.20	1.16	14.23	0.34	0.33			151.90
1848	0.26	1.27	13.83	0.34	0.29			139.54
1849	0.27	1.38	10.95	0.31	0.31			129.54
1850	0.26	1.53	11.27	0.29	0.38			137.66
1851	0.18	1.64	12.67	0.28	0.33			142.83
1852	0.24	1.55	12.92	0.25	0.41			114.82
1853	0.34	1.43	15.31	0.30	0.56			123.67
1854	0.34	1.28	16.84	0.40	0.61			171.53
1855	0.33	1.25	14.29	0.48	0.63			219.39
1856	0.34	1.50	17.07	0.47	0.77		0.57	225.73
1857	0.29	1.59	17.27	0.39	0.75		0.62	218.63

1858	0.34	1.64	16.46	0.34	0.80		0.59	200.32
1859	0.31	1.56	14.32	0.36	0.56		0.60	188.17
1860	0.32	1.60	13.84	0.37	0.49		0.59	186.33
1861	0.22	1.46	12.93	0.36	0.39		0.66	194.81
1862	0.36	1.21	15.99	0.34	0.34		0.48	187.73
1863	0.26	1.10	16.63	0.41	0.40		0.57	195.03
1864	0.35	0.91	14.93	0.43	0.41		0.66	223.64
1865	0.50	1.48	19.71	0.60	0.30		0.96	208.92
1866	0.64	1.04	18.93	0.54	0.41		0.95	203.29
1867	0.51	0.88	16.62	0.61	0.28		0.72	194.49
1868	0.55	1.09	13.55	0.56	0.30		0.73	180.30
1869	0.42	0.80	16.78	0.45	0.34		0.87	181.54
1870	0.38	0.90	25.97	0.35	0.37		0.81	194.23
1871	0.44	1.08	22.38	0.40	0.48	80.89	0.73	195.22
1872	0.40	1.10	22.76	0.42	0.48	81.96	0.57	276.97
1873	0.37	1.16	27.62	0.49	0.48	103.08	0.55	300.87
1874	0.36	1.08	24.56	0.44	0.54	97.14	0.55	280.82
1875	0.42	0.77	24.78	0.36	0.70	88.86	0.75	236.35
1876	0.35	0.91	21.46	0.37	0.61	90.17	0.77	211.87
1877	0.32	0.95	23.92	0.40	0.57	84.63	0.62	192.99
1878	0.39	0.84	19.42	0.37	0.52	86.24	0.49	178.23
1879	0.29	0.80	19.00	0.30	0.74	87.29	0.39	167.26
1880	0.32	0.76	16.84	0.35	0.68	84.85	0.40	189.86
1881	0.33	0.68	19.48	0.32	0.68	89.02	0.50	169.70
1882	0.38	0.77	20.15	0.36	0.66	81.84	0.58	178.93
1883	0.44	0.88	22.82	0.31	0.74	82.92	0.60	177.39
1884	0.36	0.77	20.14	0.29	0.52	79.43	0.48	164.50
1885	0.34	0.71	19.68	0.25	0.50	76.12	0.42	152.80
1886	0.30	0.66	19.38	0.25	0.59	68.68	0.38	146.06
1887	0.24	0.61	18.52	0.24	0.62	70.56	0.39	145.18
1888	0.23	0.50	22.45	0.23	0.55	71.43	0.42	146.44
1889	0.26	0.45	23.50	0.27	0.71	71.31	0.46	158.85
1890	0.24	0.43	20.06	0.24	0.68	72.91	0.37	175.31
1891	0.25		18.93	0.26	0.65	64.54	0.38	146.80
1892	0.28		22.41	0.27	0.52	59.80	0.37	152.55
1893	0.27		20.61	0.22	0.77	58.53	0.50	154.58
1894	0.25		17.52	0.19	0.56	54.29	0.42	151.60
1895	0.24		17.04	0.17	0.45	56.29	0.39	136.24
1896	0.25		16.50	0.20	0.56	57.02	0.31	140.12
1897	0.20		15.03	0.23	0.51	55.84	0.26	143.00
1898	0.25		15.52	0.26	0.59	65.11	0.28	153.33
1899	0.27		17.32	0.21	0.58	65.62	0.30	175.04
1900	0.22		22.12	0.20	0.69	61.04	0.33	227.38
1901	0.23		23.60	0.20	0.71	62.71	0.37	216.27
1902	0.35		20.52	0.20	0.61	53.76	0.45	175.38

1903	0.33		22.61	0.20	0.65	57.83	0.49	173.22
1904	0.26		27.93	0.23	0.68	53.07	0.38	162.32
1905	0.22		33.64	0.28	0.90	48.88	0.38	166.67
1906	0.23		25.36	0.24	0.97	50.98	0.40	172.97
1907	0.25		28.99	0.22	0.91	46.78	0.49	176.67
1908	0.30		25.35	0.26	1.00	45.05	0.48	176.23
1909	0.34		23.42	0.28	0.96	39.54	0.52	166.57
1910	0.43		32.65	0.28	1.06	41.83	0.62	173.99
1911	0.36		27.96	0.27	1.05	44.78	0.53	177.45
1912	0.34		29.41	0.26	1.58	48.33	0.46	196.85
1913	0.35		26.94	0.26	1.45	49.78	0.56	214.37

			Cotton manufactures						
Product:	Beer and ale	Coals	Plain	Printed	Dyed	Bleached	Unbleached	Petroleum/Kerosene	Iron rails
Origen:	UK	UK	UK	UK	UK	UK	UK	UK	UK
Unit:	s/litre	s/ton	s/yard	s/yard	s/yard	s/yard	s/yard	s/gallon	s/ton
1827	0.81	42.25	0.58	0.71					
1828	0.79	40.27	0.55	0.76					
1829	0.80	40.65	0.50	0.76					
1830	0.76	40.47	0.52	0.77					
1831	0.78	42.39	0.50	0.66					
1832	0.71	39.39	0.39	0.53					
1833	0.66	35.65	0.43	0.56					
1834	0.62	36.40	0.40	0.53					
1835	0.68	37.79	0.45	0.56					
1836	0.73	42.67	0.43	0.55					
1837	0.73	45.85	0.37	0.50					
1838	0.69	48.38	0.38	0.47					
1839	0.75	44.12	0.37	0.49					
1840	0.67	41.45	0.35	0.48					
1841	0.58	35.08	0.33	0.48					
1842	0.60	33.95	0.30	0.44					
1843	0.58	32.02	0.28	0.40					
1844	0.61	35.21	0.28	0.39					
1845	0.73	36.98	0.28	0.42					
1846	0.70	36.10	0.26	0.41					
1847	0.78	40.24	0.31	0.41					
1848	0.72	33.75	0.26	0.36					
1849	0.67	32.04	0.25	0.35					
1850	0.70	31.83	0.26	0.37					
1851	0.68	32.19	0.25	0.37					
1852	0.73	31.71	0.26	0.36					

1853	0.84	41.13	0.26	0.36					
1854	0.88	44.33	0.24	0.33					
1855	0.87	41.90	0.24	0.33					
1856	0.85	39.53	0.24	0.33					
1857	0.81	35.29	0.26	0.38					
1858	0.78	31.97	0.26	0.35					
1859	0.81	33.87	0.26	0.37					
1860	0.82	35.45	0.27	0.36					
1861	0.88	36.28	0.27	0.35					
1862	0.87	34.39	0.32	0.38					
1863	0.87	33.86	0.44	0.48					
1864	0.92	37.65	0.50	0.54					
1865	1.00	37.24	0.46	0.52					
1866	0.95	35.64	0.46	0.53					
1867	0.87	35.20	0.37	0.44					
1868	0.89	33.59	0.33	0.41					
1869	0.90	34.26	0.33	0.41					
1870	0.94	34.45	0.32	0.41					
1871	0.96	35.50	0.31	0.41				7.63	164.17
1872	1.01	45.31	0.33	0.43				7.98	184.81
1873	1.14	56.00	0.33	0.42				9.87	246.60
1874	1.04	47.73	0.30	0.42				7.17	254.92
1875	0.99	39.26	0.28	0.41				6.35	173.59
1876	0.99	35.57	0.26	0.38				6.37	166.26
1877	0.99	35.04	0.25	0.36				5.98	151.86
1878	0.97	33.64	0.24	0.34				5.29	148.82
1879	0.95	32.88	0.22	0.31				4.54	134.48
1880	0.94	33.80	0.24	0.33				4.10	166.37
1881	0.98	32.71	0.23	0.32				4.34	145.70
1882	1.00	33.01	0.23	0.32				4.49	146.34
1883	0.84	34.17	0.21	0.30				4.39	137.88
1884	0.60	32.54	0.21	0.30				3.47	127.29
1885	0.69	29.31	0.19	0.28				2.95	125.46
1886	0.58	27.43	0.18	0.27				2.84	101.84
1887	0.61	29.07	0.20	0.28				3.03	105.34
1888	0.68	37.35	0.20	0.28		0.21	0.18	4.20	102.08
1889	0.65	42.52	0.21	0.28		0.22	0.19	4.60	115.57
1890	0.61	39.06	0.20	0.28		0.21	0.19	3.82	133.03
1891	0.59	32.11	0.18	0.27	0.27	0.19	0.18	2.79	117.62
1892	0.54	29.43	0.16	0.25	0.24	0.18	0.14	2.57	103.09
1893	0.54	26.59	0.18	0.27	0.27	0.20	0.17	2.34	95.43
1894	0.56	27.01	0.19	0.27	0.27	0.19	0.18	2.29	91.82
1895	0.54	23.92	0.18	0.25	0.27	0.19	0.17	2.07	80.56
1896	0.55	26.46	0.18	0.25	0.27	0.19	0.18	2.54	99.09
1897	0.54	26.93	0.16	0.23	0.24	0.18	0.15	2.56	101.48

1898	0.55	29.62	0.15	0.21	0.22	0.17	0.13	2.70	97.59
1899	0.53	28.78	0.18	0.22	0.25	0.20	0.16	2.30	102.23
1900	0.64	38.01	0.20	0.23	0.27	0.22	0.17	2.94	143.24
1901	0.61	31.70	0.23	0.24	0.26	0.24	0.22	2.35	112.19
1902	0.58	27.68	0.21	0.23	0.25	0.22	0.20	2.04	115.86
1903	0.61	24.74	0.21	0.22	0.26	0.22	0.20	1.78	117.38
1904	0.68	23.95	0.22	0.25	0.28	0.25	0.19	1.77	96.95
1905	0.60	26.14	0.22	0.26	0.28	0.25	0.19	2.14	93.20
1906	0.53	27.52	0.26	0.24	0.31	0.27	0.25	2.30	107.03
1907	0.44	28.38	0.24	0.27	0.31	0.28	0.20	2.26	129.83
1908	0.49	26.82	0.26	0.27	0.32	0.29	0.24	1.94	126.22
1909	0.44	25.98	0.30	0.25	0.30	0.26	0.34	1.97	118.14
1910	0.47	31.17	0.26	0.28	0.35	0.29	0.24	2.59	121.80
1911	0.49	32.36	0.27	0.28	0.36	0.31	0.24	2.79	129.60
1912	0.52	36.35	0.27	0.29	0.37	0.31	0.23	3.18	145.48
1913	0.50	34.93	0.31	0.33	0.37	0.34	0.29	2.76	161.94

Freight factor (% of value) of import commodities

		Cotton manufactures				
	Beer and ale	Unbleached	Plain	Printed	Dyed	Bleached
1827	0.49		0.05	0.05		
1828	0.47		0.04	0.04		
1829	0.46		0.05	0.04		
1830	0.48		0.05	0.04		
1831	0.50		0.06	0.05		
1832	0.50		0.06	0.05		
1833	0.48		0.06	0.05		
1834	0.53		0.06	0.05		
1835	0.51		0.05	0.05		
1836	0.52		0.05	0.05		
1837	0.55		0.07	0.06		
1838	0.62		0.08	0.07		
1839	0.53		0.06	0.05		
1840	0.56		0.07	0.06		
1841	0.52		0.06	0.05		
1842	0.49		0.06	0.05		
1843	0.47		0.06	0.05		
1844	0.49		0.06	0.05		
1845	0.45		0.07	0.05		
1846	0.43		0.07	0.05		
1847	0.45		0.06	0.05		
1848	0.40		0.07	0.05		

1849	0.41		0.07	0.05		
1850	0.40		0.05	0.04		
1851	0.41		0.05	0.04		
1852	0.37		0.05	0.04		
1853	0.43		0.05	0.04		
1854	0.44		0.06	0.05		
1855	0.42		0.06	0.05		
1856	0.40		0.06	0.05		
1857	0.35		0.05	0.04		
1858	0.32		0.05	0.04		
1859	0.34		0.05	0.04		
1860	0.36		0.05	0.04		
1861	0.35		0.05	0.05		
1862	0.32		0.05	0.04		
1863	0.32		0.04	0.04		
1864	0.33		0.04	0.04		
1865	0.30		0.04	0.04		
1866	0.30		0.04	0.04		
1867	0.32		0.04	0.04		
1868	0.29		0.05	0.04		
1869	0.30		0.05	0.04		
1870	0.29		0.05	0.04		
1871	0.31		0.02	0.04		
1872	0.31		0.02	0.04		
1873	0.34		0.02	0.04		
1874	0.28		0.02	0.08		
1875	0.26		0.02	0.05		
1876	0.26		0.02	0.05		
1877	0.23		0.02	0.05		
1878	0.22		0.02	0.05		
1879	0.20		0.02	0.05		
1880	0.19		0.02	0.05		
1881	0.19		0.02	0.05		
1882	0.19		0.02	0.05		
1883	0.22		0.02	0.05		
1884	0.23		0.02	0.05		
1885	0.18		0.02	0.05		
1886	0.20		0.02	0.05		
1887	0.20		0.02	0.04		
1888	0.26	0.06	0.05	0.04		0.05
1889	0.29	0.05	0.05	0.04		0.05
1890	0.26	0.06	0.06	0.05		0.06
1891	0.13	0.07	0.07	0.05	0.05	0.06
1892	0.20	0.06	0.06	0.04	0.04	0.05
1893	0.18	0.06	0.06	0.04	0.04	0.05

1894	0.17	0.05	0.05	0.04	0.04	0.05
1895	0.16	0.06	0.05	0.04	0.04	0.05
1896	0.19	0.06	0.05	0.04	0.04	0.05
1897	0.20	0.06	0.05	0.04	0.04	0.05
1898	0.21	0.06	0.06	0.05	0.04	0.05
1899	0.18	0.05	0.05	0.04	0.04	0.05
1900	0.19	0.07	0.06	0.05	0.05	0.06
1901	0.16	0.08	0.08	0.07	0.07	0.07
1902	0.14	0.07	0.07	0.06	0.06	0.07
1903	0.12	0.06	0.06	0.06	0.05	0.06
1904	0.10	0.07	0.06	0.06	0.05	0.06
1905	0.14	0.07	0.06	0.05	0.05	0.06
1906	0.17	0.04	0.04	0.04	0.04	0.04
1907	0.20	0.05	0.05	0.04	0.04	0.04
1908	0.15	0.05	0.09	0.05	0.04	0.13
1909	0.17	0.04	0.04	0.05	0.04	0.04
1910	0.22	0.05	0.04	0.04	0.04	0.04
1911	0.23	0.05	0.04	0.04	0.04	0.04
1912	0.25	0.05	0.04	0.04	0.04	0.04
1913	0.22	0.04	0.04	0.04	0.04	0.04

	Coals	Beef, salted or cured	Wheat flour	Iron bars	Petroleum	Weighted
1827	0.80	0.27	0.15			0.07
1828	0.80	0.24	0.14			0.06
1829	0.78	0.20	0.12			0.06
1830	0.78	0.20	0.13			0.06
1831	0.79	0.23	0.14			0.08
1832	0.77	0.22	0.12			0.07
1833	0.74	0.20	0.11			0.07
1834	0.78	0.19	0.12			0.07
1835	0.80	0.20	0.12			0.07
1836	0.77	0.22	0.11			0.07
1837	0.76	0.19	0.09			0.08
1838	0.76	0.15	0.10			0.08
1839	0.79	0.16	0.11			0.07
1840	0.79	0.16	0.14			0.08
1841	0.75	0.18	0.12			0.07
1842	0.75	0.19	0.10			0.09
1843	0.73	0.20	0.12			0.10
1844	0.74	0.19	0.12			0.10
1845	0.76	0.20	0.12			0.10
1846	0.71	0.23	0.13			0.10
1847	0.76	0.27	0.14			0.11

1848	0.74	0.15	0.10			0.10
1849	0.74	0.13	0.10			0.10
1850	0.75	0.13	0.11			0.11
1851	0.74	0.18	0.10			0.11
1852	0.73	0.14	0.12			0.11
1853	0.75	0.13	0.13			0.11
1854	0.75		0.11			0.11
1855	0.75	0.15	0.09	0.14		0.11
1856	0.73	0.13	0.09	0.13		0.11
1857	0.69	0.13	0.09	0.11		0.10
1858	0.66	0.10	0.09	0.11		0.10
1859	0.69	0.12	0.09	0.12		0.10
1860	0.70	0.13	0.10	0.13		0.10
1861	0.71	0.19	0.10	0.13		0.11
1862	0.68	0.12	0.10	0.12		0.10
1863	0.69	0.15	0.09	0.12		0.10
1864	0.69	0.11	0.08	0.12		0.10
1865	0.69		0.06	0.12		0.09
1866	0.66	0.06	0.06	0.12		0.09
1867	0.66	0.07	0.06	0.12		0.09
1868	0.65	0.07	0.06	0.12		0.10
1869	0.66	0.08	0.07	0.12		0.10
1870	0.68	0.09	0.08	0.12		0.10
1871	0.67	0.11	0.10	0.12	0.85	0.09
1872	0.57	0.11	0.09	0.10	0.85	0.10
1873	0.59	0.15	0.10	0.11	0.86	0.11
1874	0.58	0.14	0.10	0.10	0.87	0.11
1875	0.59	0.12	0.11	0.10	0.88	0.11
1876	0.63	0.13	0.10	0.11	0.88	0.11
1877	0.65	0.12	0.09	0.12	0.82	0.11
1878	0.66	0.11	0.10	0.12	0.87	0.11
1879	0.68	0.12	0.10	0.13	0.88	0.12
1880	0.68	0.10	0.08	0.12	0.89	0.11
1881	0.67	0.08	0.07	0.13	0.87	0.11
1882	0.66	0.07	0.06	0.12	0.89	0.11
1883	0.67	0.06	0.07	0.13	0.90	0.11
1884	0.64	0.06	0.07	0.13	0.87	0.11
1885	0.62	0.06	0.07	0.11	0.86	0.10
1886	0.62	0.07	0.07	0.11	0.85	0.10
1887	0.64	0.07	0.06	0.14	0.87	0.11
1888	0.71	0.08	0.06	0.15	0.90	0.12
1889	0.69	0.09	0.08	0.13	0.91	0.12
1890	0.62	0.08	0.06	0.10	0.89	0.11
1891	0.53	0.09	0.07	0.08	0.85	0.12
1892	0.53	0.07	0.06	0.08	0.86	0.11

1893	0.54	0.07	0.06	0.07	0.87	0.12
1894	0.53	0.06	0.06	0.07	0.88	0.11
1895	0.52	0.06	0.07	0.07	0.85	0.11
1896	0.58	0.07	0.08	0.08	0.86	0.13
1897	0.59	0.08	0.08	0.08	0.88	0.13
1898	0.58	0.08	0.08	0.08	0.89	0.13
1899	0.48	0.06	0.07	0.06	0.85	0.11
1900	0.47	0.09	0.09	0.06	0.86	0.11
1901	0.44	0.05	0.05	0.06	0.83	0.10
1902	0.43	0.04	0.05	0.06	0.82	0.12
1903	0.40	0.05	0.05	0.05	0.78	0.11
1904	0.39	0.06	0.04	0.05	0.74	0.11
1905	0.47	0.06	0.04	0.06	0.80	0.13
1906	0.48	0.08	0.05	0.06	0.81	0.13
1907	0.46	0.07	0.05	0.06	0.81	0.13
1908	0.39	0.07	0.05	0.05	0.76	0.11
1909	0.41	0.06	0.04	0.06	0.77	0.11
1910	0.49	0.06	0.04	0.07	0.84	0.13
1911	0.53	0.04	0.05	0.07	0.87	0.14
1912	0.55	0.04	0.08	0.08	0.89	0.15
1913	0.49	0.03	0.05	0.06	0.87	0.13

4.1. Brazilian sugar exports, metric tons, 1796-1870.

	Rio de Janeiro	Bahia	Pernambuco
1796	7935	17120	8413
1797	3924	6213	3560
1798	14292	11147	5784
1799	9303	9982	7159
1800	4498	8936	6287
1801	17629	14529	10548
1802	12628	8891	7178
1803	9167	13316	5049
1804	7438	9593	7807
1805	8770	13350	9541
1806	11424	13120	10766
1807	10814	14005	6971
1808	323	1498	6525
1809	2228	6823	6079
1810	3733	3933	3534
1811	838	781	3182
1812		9217	4384
1813		10792	5578
1814		11569	6932
1815		15596	8539
1816		12865	8889
1817		14838	7369
1818		17022	9179
1819		21942	9868
1820		27705	9731
1821		20207	10981
1822		5761	11469
1823	17764	29475	16736
1824		15921	14057
1825	22939	20401	7099
1826	21146	20830	5903
1827	17824	17143	15780
1828	17271	16925	21145
1829	17116	19424	17209
1830	20404	21238	20436
1831	19965	18293	26127
1832	15103	18697	22038
1833	12912	15673	18893
1834	13670	20735	12397
1835	16585	20838	20160
1836	17989	18693	26539

1837	12719	16769	21140
1838	14752	25222	25407
1839	12760	18008	27269
1840	8570	18295	33055
1841	7687	21312	27862
1842	11355	14486	31798
1843	6929	25972	30734
1844	8456	30898	35785
1845	10679	27578	36667
1846	5960	31148	42566
1847	12693	50000	48514
1848	8814	49165	61286
1849	6589	55115	43223
1850	8506	57895	52475
1851		60676	52757
1852		42333	
1853		67105	
1854		46748	48810
1855	5613	49398	51189
1856	3738	36485	54248
1857	4958	36929	52622
1858	5635	26090	52683
1859	9347	49021	66527
1860	2521	14567	42659
1861	1866	17648	32247
1862	9858	52979	64376
1863	6593	55476	49765
1864	8439	32339	47796
1865	4160	44180	37602
1866	2855	50756	54423
1867	3115	43760	50938
1868	3343	47406	45425
1869	2397	47088	35725
1870	2793	30934	76228

4.2 Nominal slave prices, Brazil, Cuba, and the United States, 1835-1887.

	Rio de Janeiro	Minas Gerais	Bahia	Pernambuco	Cuba	New Orleans
	Mil-réis				Gold pesos	Dollars
1835	272	459	344	248	370	1150
1836		394	376		367	1250
1837	311	446	390		331	1300
1838		403	471		339	1225
1839	295	357	453		338	1250
1840		403	450	347	353	1000
1841	360	462	470		367	875
1842		556	481		322	750
1843		492	538		357	750
1844	379	519	494		336	700
1845	370	487	448		347	700
1846		553	530		356	750
1847	366	496	541		361	850
1848		531	540		401	950
1849	339	513	468		352	1025
1850	320	497	459		409	1100
1851	449	544	597		432	1150
1852	694	620	585	450	428	1200
1853	807	733	679	503	458	1250
1854	669	794	715	688	499	1300
1855	811	826	914		476	1350
1856	874	876	856		565	1425
1857	1006	1025	1105	1200	718	1500
1858	1152	1425	1364	1467	696	1600
1859	1090	1237	1000	1139	776	1700
1860	1017	1191	1110	1500	686	1800
1861	939	1434		1243	646	
1862	1007	1112		867	612	
1863	900	949		1158	745	
1864	1032	947		800	771	
1865	897	944	1165		697	
1866	797	840		775	579	
1867	769	933		667	541	
1868	860	882		700	603	
1869	932	959	1067		515	
1870	1008	856		1425	533	
1871	816	899		767	617	
1872	859	558		650	667	
1873	976	968			1013	
1874	959	966		456	972	

1875	1028	1000	784	400	940	
1876	1026	1075		670	800	
1877	1094	1500		644	850	
1878	932	900		698		
1879	1035		600	886		
1880	893	1200		683		
1881	918			578		
1882	608	705		350		
1883	550			750		
1884	584	800		590		
1885	797		482			
1886	325	598				
1887	450	800	468	283		

4.3. The British market for unrefined cane sugar: shares (%) of total imports, retained for consumption, and re-exports, three-year averages, 1823-1862.

	Total Imports						
	British West Indies	British Guiana	Mauritius	British East Indies	Brazil	Cuba	Others
1823	74.5	15.2	0.0	5.9	1.7	2.4	0.4
1826	73.2	15.8	1.5	5.6	1.5	2.1	0.4
1829	66.5	18.9	6.5	4.0	2.0	1.7	0.4
1832	71.8	6.0	10.1	3.8	3.9	3.1	1.3
1835	79.1	0.0	11.8	2.8	2.6	2.3	1.5
1838	73.7	0.0	11.6	6.6	2.7	2.9	2.5
1841	49.6	3.4	13.7	16.9	5.7	5.5	5.2
1844	40.6	10.4	11.7	21.6	5.2	6.5	4.0
1847	34.4	8.1	14.0	22.2	6.5	7.6	7.3
1850	32.0	9.0	13.9	20.9	7.8	9.2	7.3
1853	33.1	9.3	15.4	18.6	7.5	9.9	6.2
1856	28.3	9.6	19.4	11.4	6.5	13.6	11.1
1859	27.8	8.9	15.8	12.9	8.8	13.0	12.8
1862	26.6	9.6	13.5	8.7	8.1	17.8	15.6

	Retained			
	British West Indies & Guiana	Mauritius	British East Indies	Foreign
1823	96.1	0.0	3.9	0.0
1826	94.7	1.3	4.0	0.0
1829	91.1	6.1	2.7	0.0
1832	83.8	13.3	2.9	0.0
1835	84.2	13.3	2.6	0.0
1838	80.9	12.9	6.2	0.0
1841	65.7	16.6	17.7	0.0
1844	60.5	14.3	25.2	0.0
1847	49.2	16.4	24.4	10.0
1850	47.2	15.8	22.6	14.4
1853	45.6	16.5	20.2	17.7
1856	40.4	18.9	11.6	29.1
1859	37.2	13.5	11.3	38.0
1862	38.3	11.5	6.5	43.7

	Re-exports			
	British West Indies & Guiana	Mauritius	British East Indies	Foreign
1823	71.5	0.0	11.6	16.9
1826	75.1	1.8	6.1	17.1
1829	69.4	6.2	6.2	18.2
1832	33.1	3.4	16.6	46.9

1835	2.6	0.6	27.9	68.9
1838	2.4	0.6	27.0	70.0
1841	1.6	0.6	1.2	96.6
1844	0.7	0.2	0.7	98.5
1847	0.0	0.4	0.6	98.9
1850	0.0	0.0	0.4	99.6
1853	0.0	0.8	0.9	98.3
1856	0.8	11.6	3.8	83.7

4.4. Prices (s/cwt) of muscovado sugar in London: duty-free and duty-paid, monthly, 1/1819-12/1850.

	Duty-free				
	Barbados/Jamaica/Guiana	Bengal	Mauritius	Brazil	Cuba
1/1819	55.0				
2/1819	55.0				
3/1819	53.0				
4/1819	52.5				
5/1819	52.0				
6/1819	49.0				
7/1819	52.3				
8/1819	50.8				
9/1819	50.8				
10/1819	46.0				
11/1819	46.0				
12/1819	47.5				
1/1820	45.0				
2/1820	45.8				
3/1820	44.0				
4/1820	47.8				
5/1820	48.3				
6/1820	48.3				
7/1820	47.0				
8/1820	46.3				
9/1820	44.8				
10/1820	45.0				
11/1820	46.0				
12/1820	45.3				
1/1821	44.3				
2/1821	45.8				
3/1821	43.8				
4/1821	42.8				
5/1821	37.0				
6/1821	41.5				
7/1821	41.3				
8/1821	41.5				
9/1821	39.5				
10/1821	41.0				
11/1821	43.3				
12/1821	41.8				
1/1822	41.8				

2/1822	44.3				
3/1822	41.8				
4/1822	42.3				
5/1822	42.3				
6/1822	41.5				
7/1822	41.0				
8/1822	39.0				
9/1822	38.8				
10/1822	39.5				
11/1822	40.5				
12/1822	40.0				
1/1823	40.0				
2/1823	41.0				
3/1823	42.5				
4/1823	42.5				
5/1823	40.0				
6/1823	39.3				
7/1823	36.5				
8/1823	36.5				
9/1823	40.0				
10/1823	40.0				
11/1823	41.5				
12/1823	41.5				
1/1824	41.5				
2/1824	40.5				
3/1824	40.5				
4/1824	40.0				
5/1824	41.5				
6/1824	41.5				
7/1824	41.5				
8/1824	39.0				
9/1824	39.0				
10/1824	41.0				
11/1824	39.0				
12/1824	39.0				
1/1825	39.0				
2/1825	39.0				
3/1825	47.8				
4/1825	43.0				
5/1825	38.3				
6/1825	38.0				
7/1825	40.3				
8/1825	44.3				

9/1825	44.3				
10/1825	46.5				
11/1825	45.3				
12/1825	40.5				
1/1826	39.8				
2/1826	34.8				
3/1826	38.5				
4/1826	37.3				
5/1826	37.3				
6/1826	35.5				
7/1826	35.3				
8/1826	35.3				
9/1826	37.5				
10/1826	38.3				
11/1826	37.5				
12/1826	38.8				
1/1827	38.8				
2/1827	39.0				
3/1827	38.3				
4/1827	38.8				
5/1827	37.3				
6/1827	37.8				
7/1827	39.0				
8/1827	41.5				
9/1827	39.8				
10/1827	41.3				
11/1827	40.5				
12/1827	40.5				
1/1828	39.8				
2/1828	41.3				
3/1828	40.0				
4/1828	41.5				
5/1828	40.0				
6/1828	40.0				
7/1828	40.0				
8/1828	37.5				
9/1828	37.5				
10/1828	38.0				
11/1828	38.3				
12/1828	38.5				
1/1829	38.5				
2/1829	38.5				
3/1829	38.5				

4/1829	38.5				
5/1829					
6/1829	38.5				
7/1829					
8/1829	35.5				
9/1829	35.5				
10/1829	35.5				
11/1829	35.5				
12/1829	35.5				
1/1830	32.8				
2/1830	32.8				
3/1830	32.8				
4/1830	32.5				
5/1830	32.5				
6/1830	32.5				
7/1830	35.5				
8/1830	34.0				
9/1830	33.5				
10/1830	33.8				
11/1830	33.8				
12/1830	32.0				
1/1831	30.0				
2/1831	30.5				
3/1831	30.5				
4/1831	30.5				
5/1831	30.5				
6/1831	28.0				
7/1831	28.0				
8/1831	28.0				
9/1831	27.8				
10/1831	28.0				
11/1831	28.5				
12/1831	28.5				
1/1832					
2/1832					
3/1832					
4/1832					
5/1832					
6/1832	29.8				
7/1832	29.8				
8/1832	28.0				
9/1832	30.3				
10/1832	30.3				

11/1832	30.8				
12/1832	32.3				
1/1833	32.3				
2/1833	31.8				
3/1833	31.8				
4/1833	31.8				
5/1833	32.0				
6/1833					
7/1833	32.8				
8/1833	33.0				
9/1833	36.8				
10/1833	36.8				
11/1833	36.3				
12/1833	36.0				
1/1834	30.0	24.5	25.0	21.0	25.0
2/1834	29.7	26.5	23.5	20.8	25.0
3/1834	30.4	26.5	25.0	22.0	25.0
4/1834	30.4	26.5	25.0	22.0	25.3
5/1834	30.4	26.0	25.0	22.0	24.8
6/1834	28.8	26.0	22.5	22.0	24.8
7/1834	29.1	26.0	24.5	22.8	25.3
8/1834	29.1	26.0	24.5	23.0	25.5
9/1834	29.3	26.0	24.8	22.8	25.8
10/1834	29.9	27.5	25.8	23.3	26.3
11/1834	29.5	27.5	24.8	23.3	26.3
12/1834	30.0	27.5	25.8	24.0	27.3
1/1835	30.3	28.0	25.8	24.8	28.5
2/1835	30.2	28.8	25.8	25.8	31.0
3/1835	30.3	29.5	25.5	24.5	30.0
4/1835	30.6	29.0	30.3	24.8	28.0
5/1835	30.1	29.0	30.3	24.3	28.0
6/1835	30.0	29.5	30.5	24.3	28.0
7/1835	30.8	30.5	30.5	26.3	31.0
8/1835	32.2	31.8	35.0	28.0	34.0
9/1835	36.4	33.5	36.0	28.3	35.8
10/1835	36.6	34.0	37.5	28.8	35.3
11/1835	37.5	33.5	38.0	26.3	33.5
12/1835	37.8	33.5	38.0	26.8	34.3
1/1836	38.0	34.0	38.0	27.3	35.8
2/1836	39.3	34.5	39.3	26.8	34.8
3/1836	39.7	34.5	39.0	28.8	34.0
4/1836	39.7	34.5	39.0	26.3	34.5
5/1836	40.4	35.0	40.5	28.3	36.5

6/1836	40.2	35.0	39.5	29.5	38.5
7/1836	43.4	38.3	41.0	30.0	40.0
8/1836	42.4	37.3	39.8	28.5	39.0
9/1836	44.1	35.5	41.8	27.8	34.5
10/1836	42.6	35.5	39.8	26.5	34.8
11/1836	37.8	31.5	36.8	23.3	28.5
12/1836	32.3	29.0	35.3	23.5	28.5
1/1837	33.4	30.5	35.3	23.5	28.5
2/1837	32.1	24.5	35.8	21.5	28.0
3/1837	33.9	25.3	29.5	19.5	25.3
4/1837	33.7	25.3	27.3	19.0	24.8
5/1837	33.4	35.8	24.8	18.5	25.8
6/1837	31.7	34.0	24.3	19.3	26.0
7/1837	31.7	34.5	19.8	19.0	25.5
8/1837	30.8	33.8	21.0	18.8	23.3
9/1837	31.9	35.5	25.5	18.9	22.5
10/1837	32.6	36.8	26.3	19.8	24.5
11/1837	38.2	40.3	30.8	19.8	25.5
12/1837	38.2	40.8	31.3	21.5	26.5
1/1838	38.8	39.8	32.3	21.0	27.0
2/1838	37.1	39.8	32.3	21.8	27.0
3/1838	37.3	39.5	32.3	23.0	28.5
4/1838	32.6	35.8	31.0	22.3	27.5
5/1838	32.3	35.8	28.5	22.3	27.5
6/1838	32.8	36.5	28.5	21.0	27.5
7/1838	31.6	36.3	24.3	14.0	27.5
8/1838	29.8	33.0	22.3	20.5	25.0
9/1838	29.2	31.8	20.0	20.5	25.0
10/1838	30.9	31.8	20.3	25.8	26.3
11/1838	30.2	31.8	20.3	20.8	26.5
12/1838	31.9	33.8	21.8	20.8	26.3
1/1839	33.8	34.8	28.0	20.8	26.3
2/1839	33.9	34.8	22.5	21.0	26.3
3/1839	35.9	35.3	26.3	21.0	26.0
4/1839	37.6	35.8	28.5	21.3	26.5
5/1839	37.6	35.8	28.5	22.0	23.5
6/1839	40.1	39.0	36.0	22.5	27.0
7/1839	38.9	38.8	34.8	22.5	26.5
8/1839	39.1	38.8	36.0	22.5	26.0
9/1839	38.9	40.5	36.0	23.0	26.5
10/1839	37.5	39.3	31.8	23.0	26.0
11/1839	36.9	39.3	31.8	22.5	25.0
12/1839	35.1	38.8	29.3	21.3	25.0

1/1840	35.7	38.8	30.8	21.3	25.0
2/1840	36.5	38.8	31.0	21.3	25.0
3/1840	38.4	40.8	33.5	21.5	24.8
4/1840	38.7	40.5	33.0	21.8	25.0
5/1840	40.2	40.5	34.8	22.3	25.0
6/1840	44.5	41.8	37.8	22.3	25.0
7/1840	56.3	54.5	49.0	22.0	24.0
8/1840	56.3	55.0	49.5	23.5	25.3
9/1840	57.1	57.8	51.8	22.3	24.8
10/1840	57.1	58.3	51.8	22.0	24.8
11/1840	56.9	58.3	51.8	22.0	24.5
12/1840	54.7	51.5	37.3	22.0	24.0
1/1841	51.4	49.8	34.3	22.0	24.0
2/1841	51.7	50.0	34.3	21.8	24.0
3/1841	51.3	48.3	32.3	21.8	23.8
4/1841	46.5	39.8	24.8	20.5	22.3
5/1841	38.5	33.3	24.5	19.5	22.8
6/1841	34.6	33.5	25.3	19.8	23.3
7/1841	34.5	33.5	24.3	19.8	23.3
8/1841	34.8	36.5	23.8	18.0	21.8
9/1841	33.9	33.3	19.3	18.0	21.8
10/1841	33.7	33.5	18.8	17.5	21.8
11/1841	36.1	35.3	19.0	17.5	20.8
12/1841	39.1	38.8	19.0	17.0	20.8
1/1842	38.3	37.3	18.8	17.0	20.3
2/1842	35.5	35.8	18.8	18.8	20.3
3/1842	35.5	35.3	18.8	16.3	19.3
4/1842	35.8	36.5	24.3	16.3	19.3
5/1842	35.6	36.0	24.3	16.3	19.3
6/1842	34.4	35.5	23.0	16.3	18.8
7/1842	35.2	35.5	23.0	16.3	18.8
8/1842	33.4	35.5	23.0	16.3	18.8
9/1842	34.9	35.5	22.8	16.3	18.3
10/1842	34.9	35.8	24.3	16.3	18.8
11/1842	35.1	36.3	24.3	16.3	18.8
12/1842	35.4	36.3	24.3	16.8	19.8
1/1843	35.4	35.3	24.3	17.3	19.8
2/1843	32.0	33.5	22.3	17.5	19.8
3/1843	33.9	33.5	22.3	17.5	19.8
4/1843	33.7	33.5	22.3	17.5	19.8
5/1843	33.9	33.8	22.3	17.5	19.8
6/1843	36.1	34.0	26.3	17.5	19.8
7/1843	35.6	34.0	26.3	17.5	19.8

8/1843	34.9	34.5	26.3	17.0	19.3
9/1843	34.4	34.3	25.8	17.3	19.3
10/1843	34.4	34.3	25.8	17.3	19.3
11/1843	34.4	34.3	25.8	17.0	19.0
12/1843	33.9	34.3	25.8	16.3	19.3
1/1844	32.6	34.3	25.8	16.3	19.3
2/1844	35.5	34.5	26.8	16.3	19.5
3/1844	36.3	35.0	27.8	17.5	20.5
4/1844	35.0	33.8	28.0	17.5	20.5
5/1844	36.4	35.5	28.0	17.5	20.5
6/1844	42.2	34.0	27.3	17.5	20.5
7/1844	35.3	33.3	26.3	17.3	19.3
8/1844	33.9	34.0	23.8	17.3	18.8
9/1844	32.5	34.0	22.3	17.3	19.3
10/1844	32.4	34.0	22.3	17.3	20.0
11/1844	31.9	31.5	20.8	17.3	20.0
12/1844	32.4	31.5	20.8	17.8	20.8
1/1845	32.1	31.8	20.3	17.8	20.5
2/1845	30.5	30.3	19.3	17.8	20.8
3/1845	42.8	44.8	33.0	17.8	20.5
4/1845	29.8	32.0	22.8	17.8	20.5
5/1845	31.4	31.0	22.0	17.8	22.8
6/1845	32.8	31.0	17.5	20.5	24.3
7/1845	32.6	31.8	25.8	20.0	25.0
8/1845	33.6	31.8	26.0	23.5	27.5
9/1845	34.8	34.3	28.0	24.0	29.5
10/1845	35.3	34.3	26.0	24.5	29.5
11/1845	37.7	36.3	28.0	22.5	27.0
12/1845	35.7	37.5	29.5	22.0	27.0
1/1846	35.5	35.3	28.5	20.0	25.8
2/1846	35.5	34.5	27.0	19.5	23.5
3/1846	34.7	34.3	26.8	19.5	22.5
4/1846	33.8	35.8	28.5	18.0	21.0
5/1846	36.2	36.8	29.5	17.5	20.5
6/1846	35.9	36.0	29.0	17.5	20.5
7/1846	35.4	36.5	29.8	19.8	22.8
8/1846	33.2	34.8	27.8	21.3	23.0
9/1846	33.0	32.5	26.3	22.0	24.3
10/1846	33.3	33.5	23.5	22.0	24.3
11/1846	34.3	34.3	26.0	22.0	27.0
12/1846	34.3	33.8	25.5	22.0	27.0
1/1847	33.2	33.0	25.0	21.5	25.5
2/1847	36.7	35.3	30.0	24.5	30.5

3/1847	35.6	34.3	28.5	24.5	30.5
4/1847	33.9	33.3	26.5	26.0	29.3
5/1847	30.5	30.0	25.5	24.0	25.5
6/1847	29.6	31.0	25.5	22.8	25.0
7/1847	27.8	26.8	22.0	22.8	25.0
8/1847	27.8	27.3	21.5	21.5	23.3
9/1847	28.1	27.3	20.5	20.0	22.0
10/1847	26.6	27.0	19.0	20.3	22.0
11/1847	23.3	25.5	16.0	18.5	21.5
12/1847	24.3	24.5	16.5	18.5	21.5
1/1848	24.4	24.3	16.0	18.5	21.5
2/1848	25.6	25.3	18.0	19.8	22.0
3/1848	24.3	24.3	18.0	17.0	21.0
4/1848	22.3	22.0	17.8	16.5	21.0
5/1848	22.6	22.5	17.8	16.5	20.0
6/1848	24.8	24.3	18.3	16.5	20.0
7/1848	25.5	25.0	19.3	15.8	20.0
8/1848	24.8	25.0	19.0	15.3	20.0
9/1848	24.0	23.8	18.8	15.3	18.8
10/1848	23.4	23.8	17.5	15.3	19.0
11/1848	23.3	23.8	17.5	15.0	19.0
12/1848	23.1	23.8	17.5	15.0	19.0
1/1849	22.9	23.8	16.8	15.0	19.3
2/1849	24.1	23.8	17.5	16.0	19.8
3/1849	24.7	23.8	20.0	16.0	20.8
4/1849	25.4	24.3	20.0	19.0	23.0
5/1849	25.4	24.3	21.0	19.5	22.3
6/1849	25.5	25.0	22.0	19.0	22.8
7/1849	26.4	26.0	23.0	19.5	22.8
8/1849	25.4	25.3	22.8	19.0	22.0
9/1849	24.9	25.0	21.0	19.3	21.5
10/1849	24.9	25.0	20.5	19.3	21.0
11/1849	24.8	24.3	20.0	19.3	20.5
12/1849	24.9	24.3	20.0	19.3	20.5
1/1850	25.3	24.3	19.8	18.8	17.3
2/1850	25.8	24.8	20.5	18.5	20.5
3/1850	25.3	24.3	20.0	18.5	20.5
4/1850	25.1	23.8	19.0	18.0	20.0
5/1850	24.3	23.3	19.0	18.0	20.0
6/1850	24.3	23.5	19.0	18.0	20.0
7/1850	26.2	24.5	20.0	18.0	20.0
8/1850	25.0	24.0	19.5	17.5	19.0
9/1850	25.3	24.0	19.5	17.5	19.5

10/1850	25.3	24.0	19.5	17.5	19.5
11/1850	25.9	24.0	21.8	17.5	19.5
12/1850	25.9	20.0	21.8	17.5	19.5
	Duty-paid				
	Barbados/Jamaica/Guiana	Bengal	Mauritius	Brazil	Cuba
1/1819	85.0				
2/1819	85.0				
3/1819	83.0				
4/1819	82.5				
5/1819	80.0				
6/1819	77.0				
7/1819	80.3				
8/1819	77.8				
9/1819	77.8				
10/1819	73.0				
11/1819	73.0				
12/1819	74.5				
1/1820	72.0				
2/1820	72.8				
3/1820	71.0				
4/1820	74.8				
5/1820	75.3				
6/1820	75.3				
7/1820	74.0				
8/1820	73.3				
9/1820	71.8				
10/1820	72.0				
11/1820	73.0				
12/1820	72.3				
1/1821	71.3				
2/1821	72.8				
3/1821	70.8				
4/1821	69.8				
5/1821	64.0				
6/1821	68.5				
7/1821	68.3				
8/1821	68.5				
9/1821	66.5				
10/1821	68.0				
11/1821	70.3				
12/1821	68.8				
1/1822	68.8				
2/1822	71.3				

3/1822	68.8				
4/1822	69.3				
5/1822	69.3				
6/1822	68.5				
7/1822	68.0				
8/1822	66.0				
9/1822	65.8				
10/1822	66.5				
11/1822	67.5				
12/1822	67.0				
1/1823	67.0				
2/1823	68.0				
3/1823	69.5				
4/1823	69.5				
5/1823	67.0				
6/1823	66.3				
7/1823	63.5				
8/1823	63.5				
9/1823	67.0				
10/1823	67.0				
11/1823	68.5				
12/1823	68.5				
1/1824	68.5				
2/1824	67.5				
3/1824	67.5				
4/1824	67.0				
5/1824	68.5				
6/1824	68.5				
7/1824	68.5				
8/1824	66.0				
9/1824	66.0				
10/1824	68.0				
11/1824	66.0				
12/1824	66.0				
1/1825	66.0				
2/1825	66.0				
3/1825	74.8				
4/1825	70.0				
5/1825	65.3				
6/1825	65.0				
7/1825	67.3				
8/1825	71.3				
9/1825	71.3				

10/1825	73.5				
11/1825	72.3				
12/1825	67.5				
1/1826	66.8				
2/1826	61.8				
3/1826	65.5				
4/1826	64.3				
5/1826	64.3				
6/1826	62.5				
7/1826	62.3				
8/1826	62.3				
9/1826	64.5				
10/1826	65.3				
11/1826	64.5				
12/1826	65.8				
1/1827	65.8				
2/1827	66.0				
3/1827	65.3				
4/1827	65.8				
5/1827	64.3				
6/1827	64.8				
7/1827	66.0				
8/1827	68.5				
9/1827	66.8				
10/1827	68.3				
11/1827	67.5				
12/1827	67.5				
1/1828	66.8				
2/1828	68.3				
3/1828	67.0				
4/1828	68.5				
5/1828	67.0				
6/1828	67.0				
7/1828	67.0				
8/1828	64.5				
9/1828	64.5				
10/1828	65.0				
11/1828	65.3				
12/1828	65.5				
1/1829	65.5				
2/1829	65.5				
3/1829	65.5				
4/1829	65.5				

5/1829					
6/1829	65.5				
7/1829					
8/1829	62.5				
9/1829	62.5				
10/1829	62.5				
11/1829	62.5				
12/1829	62.5				
1/1830	59.8				
2/1830	59.8				
3/1830	59.8				
4/1830	59.5				
5/1830	59.5				
6/1830	59.5				
7/1830	59.5				
8/1830	58.0				
9/1830	57.5				
10/1830	57.8				
11/1830	57.8				
12/1830	56.0				
1/1831	54.0				
2/1831	54.5				
3/1831	54.5				
4/1831	54.5				
5/1831	54.5				
6/1831	52.0				
7/1831	52.0				
8/1831	52.0				
9/1831	51.8				
10/1831	52.0				
11/1831	52.5				
12/1831	52.5				
1/1832					
2/1832					
3/1832					
4/1832					
5/1832					
6/1832	53.8				
7/1832	53.8				
8/1832	52.0				
9/1832	54.3				
10/1832	54.3				
11/1832	54.8				

12/1832	56.3				
1/1833	56.3				
2/1833	55.8				
3/1833	55.8				
4/1833	55.8				
5/1833	56.0				
6/1833					
7/1833	56.8				
8/1833	57.0				
9/1833	60.8				
10/1833	60.8				
11/1833	60.3				
12/1833	60.0				
1/1834	54.0	56.5	49.0	84.0	88.0
2/1834	53.7	58.5	47.5	83.8	88.0
3/1834	54.4	58.5	49.0	85.0	88.0
4/1834	54.4	58.5	49.0	85.0	88.3
5/1834	54.4	58.0	49.0	85.0	87.8
6/1834	52.8	58.0	46.5	85.0	87.8
7/1834	53.1	58.0	48.5	85.8	88.3
8/1834	53.1	58.0	48.5	86.0	88.5
9/1834	53.3	58.0	48.8	85.8	88.8
10/1834	53.9	59.5	49.8	86.3	89.3
11/1834	53.5	59.5	48.8	86.3	89.3
12/1834	54.0	59.5	49.8	87.0	90.3
1/1835	54.3	60.0	49.8	87.8	91.5
2/1835	54.2	60.8	49.8	88.8	94.0
3/1835	54.3	61.5	49.5	87.5	93.0
4/1835	54.6	61.0	54.3	87.8	91.0
5/1835	54.1	61.0	54.3	87.3	91.0
6/1835	54.0	61.5	54.5	87.3	91.0
7/1835	54.8	62.5	54.5	89.3	94.0
8/1835	56.2	63.8	59.0	91.0	97.0
9/1835	60.4	65.5	60.0	91.3	98.8
10/1835	60.6	66.0	61.5	91.8	98.3
11/1835	61.5	65.5	62.0	89.3	96.5
12/1835	61.8	65.5	62.0	89.8	97.3
1/1836	62.0	66.0	62.0	90.3	98.8
2/1836	63.3	66.5	63.3	89.8	97.8
3/1836	63.7	66.5	63.0	91.8	97.0
4/1836	63.7	66.5	63.0	89.3	97.5
5/1836	64.4	67.0	64.5	91.3	99.5
6/1836	65.4	59.0	64.8	92.5	101.5

7/1836	68.6	62.3	66.3	93.0	103.0
8/1836	67.7	61.3	65.0	91.5	102.0
9/1836	69.3	59.5	67.0	90.8	97.5
10/1836	67.8	59.5	65.0	89.5	97.8
11/1836	63.0	55.5	62.0	86.3	91.5
12/1836	57.5	53.0	60.5	86.5	91.5
1/1837	58.6	54.5	60.5	86.5	91.5
2/1837	57.3	48.5	61.0	84.5	91.0
3/1837	59.1	49.3	54.8	82.5	88.3
4/1837	59.0	49.3	52.5	82.0	87.8
5/1837	58.6	59.8	50.0	81.5	88.8
6/1837	56.9	58.0	49.5	82.3	89.0
7/1837	56.9	58.5	45.0	82.0	88.5
8/1837	56.0	57.8	46.3	81.8	86.3
9/1837	57.2	59.5	50.8	81.9	85.5
10/1837	57.8	60.8	51.5	82.8	87.5
11/1837	63.5	64.3	56.0	82.8	88.5
12/1837	63.4	64.8	56.5	84.5	89.5
1/1838	64.0	63.8	57.5	84.0	90.0
2/1838	62.4	63.8	57.5	84.8	90.0
3/1838	62.5	63.5	57.5	86.0	91.5
4/1838	57.9	59.8	56.3	85.3	90.5
5/1838	57.5	59.8	53.8	85.3	90.5
6/1838	58.0	60.5	53.8	84.0	90.5
7/1838	56.8	60.3	49.5	77.0	90.5
8/1838	55.0	57.0	47.5	83.5	88.0
9/1838	54.4	55.8	45.3	83.5	88.0
10/1838	56.2	55.8	45.5	88.8	89.3
11/1838	55.4	55.8	45.5	83.8	89.5
12/1838	57.2	57.8	47.0	83.8	89.3
1/1839	59.0	58.8	53.3	83.8	89.3
2/1839	59.2	58.8	47.8	84.0	89.3
3/1839	61.1	59.3	51.5	84.0	89.0
4/1839	62.9	59.8	53.8	84.3	89.5
5/1839	62.8	59.8	53.8	85.0	86.5
6/1839	65.3	63.0	61.3	85.5	90.0
7/1839	64.1	62.8	60.0	85.5	89.5
8/1839	64.3	62.8	61.3	85.5	89.0
9/1839	64.1	64.5	61.3	86.0	89.5
10/1839	62.8	63.3	57.0	86.0	89.0
11/1839	62.1	63.3	57.0	85.5	88.0
12/1839	60.3	62.8	54.5	84.3	88.0
1/1840	60.9	62.8	56.0	84.3	88.0

2/1840	61.8	62.8	56.3	84.3	88.0
3/1840	63.7	64.8	58.8	84.5	87.8
4/1840	63.9	64.5	58.3	84.8	88.0
5/1840	65.4	65.8	60.0	88.4	91.2
6/1840	69.8	67.0	63.0	88.4	91.2
7/1840	81.5	79.8	74.3	88.2	90.2
8/1840	81.5	80.3	74.8	89.7	91.4
9/1840	82.3	83.0	77.0	88.4	90.9
10/1840	82.3	83.5	77.0	88.2	90.9
11/1840	82.1	83.5	77.0	88.2	90.7
12/1840	79.9	76.8	62.5	88.2	90.2
1/1841	76.7	75.0	59.5	88.2	90.2
2/1841	76.9	75.3	59.5	87.9	90.2
3/1841	76.5	73.5	57.5	87.9	89.9
4/1841	71.8	65.0	50.0	86.7	88.4
5/1841	63.8	58.5	49.8	85.7	88.9
6/1841	59.8	58.8	50.5	85.9	89.4
7/1841	59.8	58.8	49.5	85.9	89.4
8/1841	60.0	61.8	49.0	84.2	87.9
9/1841	59.1	58.5	44.5	84.2	87.9
10/1841	58.9	58.8	44.0	83.7	87.9
11/1841	61.3	60.5	44.3	83.7	86.9
12/1841	64.3	64.0	44.3	83.2	86.9
1/1842	63.5	62.5	44.0	83.2	86.4
2/1842	60.8	61.0	44.0	84.9	86.4
3/1842	60.8	60.5	44.0	82.4	85.4
4/1842	61.0	61.8	49.5	82.4	85.4
5/1842	60.9	61.3	49.5	82.4	85.4
6/1842	59.7	60.8	48.3	82.4	84.9
7/1842	60.4	60.8	48.3	82.4	84.9
8/1842	58.6	60.8	48.3	82.4	84.9
9/1842	60.1	60.8	48.0	82.4	84.4
10/1842	60.2	61.0	49.5	82.4	84.9
11/1842	60.3	61.5	49.5	82.4	84.9
12/1842	60.7	61.5	49.5	82.9	85.9
1/1843	60.6	60.5	49.5	83.4	85.9
2/1843	57.3	58.8	47.5	83.7	85.9
3/1843	59.2	58.8	47.5	83.7	85.9
4/1843	58.9	58.8	47.5	83.7	85.9
5/1843	59.2	59.0	47.5	83.7	85.9
6/1843	61.3	59.3	51.5	83.7	85.9
7/1843	60.8	59.3	51.5	83.7	85.9
8/1843	60.2	59.8	51.5	83.2	85.4

9/1843	59.6	59.5	51.0	83.4	85.4
10/1843	59.6	59.5	51.0	83.4	85.4
11/1843	59.6	59.5	51.0	83.2	85.2
12/1843	59.1	59.5	51.0	82.4	85.4
1/1844	57.8	59.5	51.0	82.4	85.4
2/1844	60.8	59.8	52.0	82.4	85.7
3/1844	61.5	60.3	53.0	83.7	86.7
4/1844	60.3	59.0	53.3	83.7	86.7
5/1844	61.6	60.8	53.3	83.7	86.7
6/1844	67.4	59.3	52.5	83.7	86.7
7/1844	60.5	58.5	51.5	83.4	85.4
8/1844	59.1	59.3	49.0	83.4	84.9
9/1844	57.8	59.3	47.5	83.4	85.4
10/1844	57.6	59.3	47.5	83.4	86.2
11/1844	57.1	56.8	46.0	83.4	86.2
12/1844	57.7	56.8	46.0	83.9	86.9
1/1845	57.3	57.0	45.5	83.9	86.7
2/1845	55.8	55.5	44.5	83.9	86.9
3/1845	56.8	58.8	47.0	80.8	83.5
4/1845	43.8	46.0	36.8	80.8	83.5
5/1845	45.4	45.0	36.0	80.8	85.8
6/1845	46.8	45.0	31.5	83.5	87.3
7/1845	46.6	45.8	39.8	83.0	88.0
8/1845	47.6	45.8	40.0	86.5	90.5
9/1845	48.8	48.3	42.0	87.0	92.5
10/1845	49.3	48.3	40.0	87.5	92.5
11/1845	51.7	50.3	42.0	85.5	90.0
12/1845	49.7	51.5	43.5	85.0	90.0
1/1846	49.5	49.3	42.5	83.0	88.8
2/1846	49.5	48.5	41.0	82.5	86.5
3/1846	48.7	48.3	40.8	82.5	85.5
4/1846	47.8	49.8	42.5	81.0	84.0
5/1846	50.2	50.8	43.5	80.5	83.5
6/1846	49.9	50.0	43.0	80.5	83.5
7/1846	49.4	50.5	43.8	82.8	85.8
8/1846	47.2	48.8	41.8	42.3	44.0
9/1846	47.0	46.5	40.3	43.0	45.3
10/1846	47.3	47.5	37.5	43.0	45.3
11/1846	48.3	48.3	40.0	43.0	48.0
12/1846	48.3	47.8	39.5	43.0	48.0
1/1847	47.2	47.0	39.0	42.5	46.5
2/1847	50.7	49.3	44.0	45.5	51.5
3/1847	49.6	48.3	42.5	45.5	51.5

4/1847	47.9	47.3	40.5	47.0	50.3
5/1847	44.5	44.0	39.5	45.0	46.5
6/1847	43.6	45.0	39.5	43.8	46.0
7/1847	41.8	40.8	36.0	42.8	45.0
8/1847	41.8	41.3	35.5	41.5	43.3
9/1847	42.1	41.3	34.5	40.0	42.0
10/1847	40.6	41.0	33.0	40.3	42.0
11/1847	37.3	39.5	30.0	38.5	41.5
12/1847	38.3	38.5	30.5	38.5	41.5
1/1848	38.4	38.3	30.0	38.5	41.5
2/1848	39.6	39.3	32.0	39.8	42.0
3/1848	38.3	38.3	32.0	37.0	41.0
4/1848	36.3	36.0	31.8	36.5	41.0
5/1848	36.6	36.5	31.8	36.5	40.0
6/1848	38.8	38.3	32.3	36.5	40.0
7/1848	38.5	38.0	32.3	34.3	38.5
8/1848	37.8	38.0	32.0	33.8	38.5
9/1848	37.0	36.8	31.8	33.8	37.3
10/1848	36.4	36.8	30.5	33.8	37.5
11/1848	36.3	36.8	30.5	33.5	37.5
12/1848	36.1	36.8	30.5	33.5	37.5
1/1849	35.9	36.8	29.8	33.5	37.8
2/1849	37.1	36.8	30.5	34.5	38.3
3/1849	37.7	36.8	33.0	34.5	39.3
4/1849	38.4	37.3	33.0	37.5	41.5
5/1849	38.4	37.3	34.0	38.0	40.8
6/1849	38.5	38.0	35.0	37.5	41.3
7/1849	38.4	38.0	35.0	36.5	39.8
8/1849	37.4	37.3	34.8	36.0	39.0
9/1849	36.9	37.0	33.0	36.3	38.5
10/1849	36.9	37.0	32.5	36.3	38.0
11/1849	36.8	36.3	32.0	36.3	37.5
12/1849	36.9	36.3	32.0	36.3	37.5
1/1850	37.3	36.3	31.8	35.8	34.3
2/1850	37.8	36.8	32.5	35.5	37.5
3/1850	37.3	36.3	32.0	35.5	37.5
4/1850	37.1	35.8	31.0	35.0	37.0
5/1850	36.3	35.3	31.0	35.0	37.0
6/1850	36.3	35.5	31.0	35.0	37.0
7/1850	37.2	35.5	31.0	33.5	35.5
8/1850	36.0	35.0	30.5	33.0	34.5
9/1850	36.3	35.0	30.5	33.0	35.0
10/1850	36.3	35.0	30.5	33.0	35.0

11/1850	36.9	35.0	32.8	33.0	35.0
12/1850	36.9	31.0	32.8	33.0	35.0

4.5. Monthly sugar imports to the port of Liverpool, metric tons, 1/1827-12/1853.

	British West Indies	British India	British East Indies	Brazil	Other non-colonial	Total
1/1827	705.2	0.0	0.0	0.0	0.0	705.2
2/1827	1122.3	0.0	0.0	21.8	0.0	1144.1
3/1827	1665.8	171.6	0.0	50.0	31.9	1919.3
4/1827	566.7	175.9	0.0	18.9	0.0	761.4
5/1827	3228.4	62.5	0.0	0.0	0.0	3290.9
6/1827	4809.1	330.6	0.0	39.9	0.0	5179.6
7/1827	2568.2	97.8	0.0	45.0	0.0	2710.9
8/1827	2750.0	56.0	0.0	21.8	0.0	2827.8
9/1827	3892.4	20.8	0.0	59.5	0.0	3972.6
10/1827	2116.3	65.4	0.0	14.5	0.0	2196.2
11/1827	1684.0	53.8	0.0	70.6	39.2	1847.5
12/1827	2071.7	0.0	0.0	246.5	0.0	2318.2
1/1828	702.8	0.0	0.0	73.2	190.7	966.7
2/1828	1279.8	0.0	0.0	101.5	0.0	1381.3
3/1828	1403.3	132.7	56.3	15.8	0.0	1608.0
4/1828	2175.1	125.6	0.0	0.0	0.0	2300.8
5/1828	4084.8	184.4	0.0	92.8	0.0	4362.0
6/1828	5607.5	0.0	328.9	13.8	0.0	5950.2
7/1828	4791.7	195.1	0.0	0.0	99.9	5086.7
8/1828	4986.2	48.4	0.0	56.6	112.5	5203.6
9/1828	2268.5	70.8	0.0	13.8	0.0	2353.1
10/1828	3065.4	0.0	0.0	21.4	0.0	3086.7
11/1828	964.6	0.0	0.0	54.0	0.0	1018.6
12/1828	1052.7	0.0	0.0	21.8	0.0	1074.5
1/1829	724.7	164.3	0.0	86.2	0.0	975.1
2/1829	1924.0	173.5	0.0	171.9	0.0	2269.4
3/1829	1126.7	343.6	233.3	74.0	0.0	1777.5
4/1829	4281.5	68.5	0.0	4.4	0.0	4354.4
5/1829	4653.9	396.8	252.3	73.7	0.0	5376.8
6/1829	3349.6	0.0	0.0	34.8	0.0	3384.4
7/1829	5751.0	9.8	0.0	0.0	0.0	5760.8
8/1829	3278.5	0.0	0.0	20.1	0.0	3298.6
9/1829	3279.5	0.0	0.0	11.6	96.4	3387.5
10/1829	1022.9	33.4	0.0	72.5	0.0	1128.8
11/1829	485.4	0.0	0.0	0.0	0.0	485.4
12/1829	1403.3	74.4	0.0	0.0	0.0	1477.7
1/1830	302.5	232.5	0.0	0.0	0.0	535.0
2/1830	2340.4	210.9	536.4	81.6	3.5	3172.7

3/1830	1590.9	202.4	0.0	0.0	0.0	1793.2
4/1830	1896.5	78.1	332.0	72.4	0.0	2379.0
5/1830	3737.0	245.3	0.0	0.0	0.0	3982.3
6/1830	1593.3	172.8	311.9	23.9	35.0	2136.9
7/1830	6182.7	68.8	0.0	76.8	0.0	6328.3
8/1830	4227.6	106.5	0.0	122.1	0.0	4456.2
9/1830	3352.0	39.9	0.0	55.1	0.0	3447.0
10/1830	1600.7	128.1	0.0	117.5	0.0	1846.2
11/1830	1528.2	87.7	0.0	187.1	0.0	1802.9
12/1830	950.4	132.1	0.0	50.8	0.0	1133.3
1/1831	876.6	140.4	0.0	0.0	0.0	1017.0
2/1831	3678.6	0.0	0.0	990.9	9.8	4679.2
3/1831	1281.9	116.8	0.0	719.3	291.3	2409.2
4/1831	2171.6	115.5	480.2	685.6	458.0	3910.9
5/1831	4979.6	45.4	0.0	333.5	0.0	5358.5
6/1831	7183.0	27.7	388.9	1310.3	811.1	9721.0
7/1831	3662.7	390.4	0.0	578.7	0.0	4631.8
8/1831	2922.2	0.0	0.0	764.4	287.5	3974.1
9/1831	4489.6	0.1	0.0	787.2	0.0	5276.8
10/1831	1102.3	0.0	0.0	260.3	286.0	1648.5
11/1831	358.8	15.1	0.0	902.1	0.0	1276.0
12/1831	1931.3	162.8	0.0	496.0	0.0	2590.1
1/1832	840.6	35.4	407.2	589.1	0.0	1872.3
2/1832	2127.6	0.0	399.6	124.1	0.0	2651.3
3/1832	680.7	27.9	0.0	144.5	181.1	1034.3
4/1832	2311.1	192.4	319.0	303.8	0.0	3126.3
5/1832	1250.1	0.0	0.0	60.9	105.4	1416.3
6/1832	6282.4	29.7	0.0	290.1	0.0	6602.2
7/1832	2351.7	0.0	0.0	0.0	0.0	2351.7
8/1832	5726.5	91.3	0.0	147.0	150.3	6115.1
9/1832	3850.9	0.0	0.0	43.5	101.6	3996.0
10/1832	632.5	94.4	397.0	151.0	0.0	1274.8
11/1832	2223.0	0.0	352.1	214.9	0.0	2790.0
12/1832	2014.3	182.3	0.0	92.6	480.5	2769.7
1/1833	595.6	335.6	399.2	0.0	0.0	1330.4
2/1833	1457.4	62.2	420.5	306.1	0.0	2246.2
3/1833	2818.0	186.3	62.6	0.0	0.0	3066.9
4/1833	2495.7	70.5	870.0	54.4	0.0	3490.6
5/1833	4655.0	40.8	918.8	190.8	215.8	6021.1
6/1833	5702.0	0.0	307.2	138.2	0.0	6147.3
7/1833	2675.3	0.0	239.3	0.0	0.0	2914.6
8/1833	4836.8	0.0	316.0	112.4	183.4	5448.5
9/1833	1122.9	120.4	0.0	230.9	0.0	1474.2

10/1833	896.3	18.3	0.0	88.8	0.0	1003.4
11/1833	1213.7	0.0	292.5	118.2	0.0	1624.4
12/1833	1478.9	95.9	496.8	314.9	4.4	2390.9
1/1834	1413.9	0.0	266.0	211.9	147.9	2039.6
2/1834	2149.2	62.5	1447.2	341.0	0.0	3999.9
3/1834	762.9	215.3	375.3	0.0	0.0	1353.4
4/1834	1064.2	0.0	869.9	339.5	0.0	2273.6
5/1834	4055.1	136.7	0.0	124.0	0.0	4315.8
6/1834	3745.8	198.2	731.9	0.0	0.0	4675.9
7/1834	1621.4	179.5	635.3	81.2	17.5	2534.9
8/1834	2714.8	29.8	284.1	218.4	0.0	3247.0
9/1834	4810.4	0.0	428.8	54.6	552.6	5846.4
10/1834	2851.0	14.4	0.0	62.4	0.0	2927.8
11/1834	285.2	100.0	0.0	50.8	0.0	436.0
12/1834	3198.2	602.6	0.0	0.0	487.5	4288.3
1/1835	1648.7	302.5	176.7	77.0	545.8	2750.6
2/1835	1839.6	134.6	414.9	90.2	227.0	2706.2
3/1835	2092.0	336.8	833.2	87.4	0.0	3349.3
4/1835	1808.4	167.3	530.9	412.1	277.7	3196.4
5/1835	6317.0	420.3	1569.6	511.8	150.9	8969.6
6/1835	4853.9	0.0	444.7	220.5	0.0	5519.0
7/1835	3425.3	0.0	277.4	0.0	0.0	3702.6
8/1835	2824.6	116.4	228.6	275.7	121.5	3566.8
9/1835	5534.9	97.7	0.0	401.6	0.0	6034.2
10/1835	1607.6	107.1	0.0	0.0	0.0	1714.6
11/1835	1321.9	0.0	0.0	379.2	0.0	1701.1
12/1835	2627.6	136.0	32.6	338.8	104.4	3239.4
1/1836	1488.0	232.2	312.5	427.1	225.8	2685.6
2/1836	2024.6	177.7	279.1	98.2	0.0	2579.6
3/1836	3722.1	461.3	290.4	745.0	67.8	5286.7
4/1836	3285.3	68.8	294.8	366.7	4.6	4020.0
5/1836	1731.5	568.1	328.6	361.4	0.0	2989.5
6/1836	6855.1	166.3	131.4	159.7	0.0	7312.4
7/1836	5445.5	0.0	527.4	277.1	0.0	6250.0
8/1836	1722.7	157.1	501.7	435.5	10.6	2827.4
9/1836	5275.2	525.0	0.0	365.3	0.0	6165.5
10/1836	1706.1	50.1	387.5	48.2	0.0	2191.9
11/1836	2254.7	232.5	60.8	144.5	0.0	2692.5
12/1836	1947.1	56.3	0.0	157.6	0.0	2161.1
1/1837	1829.7	474.1	55.6	81.6	0.0	2441.0
2/1837	2325.2	450.1	335.9	338.2	207.3	3656.7
3/1837	1327.9	227.5	969.5	77.9	352.2	2955.1
4/1837	3358.9	386.6	1115.3	242.4	819.6	5922.8

5/1837	2786.1	874.2	0.0	183.5	0.0	3843.8
6/1837	7215.7	250.0	938.7	380.9	55.9	8841.1
7/1837	2411.2	297.1	0.0	279.7	7.0	2995.0
8/1837	3561.5	243.8	253.3	106.0	0.0	4164.7
9/1837	1223.4	277.3	0.0	215.5	0.0	1716.2
10/1837	2172.2	211.2	0.0	132.4	0.0	2520.9
11/1837	1497.5	473.4	0.0	328.7	614.1	2913.7
12/1837	1420.9	1352.8	0.0	184.5	327.4	3285.6
1/1838	1909.8	823.8	328.7	191.9	0.0	3254.1
2/1838	1150.7	0.0	945.4	134.2	0.0	2230.2
3/1838	2067.8	1169.0	544.8	458.2	380.1	4619.8
4/1838	2863.4	514.5	575.9	113.2	0.0	4066.9
5/1838	2256.9	162.8	0.0	512.1	0.0	2931.8
6/1838	4491.2	1425.8	1144.4	1046.4	547.1	8654.7
7/1838	3196.2	371.9	372.1	71.3	0.0	4011.5
8/1838	5310.8	632.3	0.0	464.8	0.0	6407.8
9/1838	3593.8	219.5	0.0	73.6	202.7	4089.6
10/1838	1986.9	253.5	79.4	220.0	0.0	2539.8
11/1838	120.5	389.8	0.0	251.1	0.0	761.4
12/1838	1633.8	891.3	0.0	129.4	0.0	2654.5
1/1839	1438.9	596.5	240.4	232.9	0.0	2508.7
2/1839	1363.7	161.7	364.0	713.4	58.8	2661.5
3/1839	2344.8	1025.5	782.3	164.3	0.0	4316.8
4/1839	1428.8	131.7	329.6	446.7	0.0	2336.8
5/1839	2059.5	34.0	639.8	284.0	0.0	3017.2
6/1839	5297.2	324.5	1466.8	1287.4	7.3	8383.1
7/1839	2925.9	708.0	9.1	391.0	248.5	4282.5
8/1839	2715.0	528.6	0.0	798.7	806.2	4848.6
9/1839	2871.4	214.1	0.0	644.4	2.3	3732.1
10/1839	1847.8	87.3	0.0	729.1	0.0	2664.2
11/1839	677.7	1008.5	503.9	429.4	10.5	2630.0
12/1839	493.6	1114.3	0.0	376.6	0.0	1984.4
1/1840	2079.9	786.3	1082.1	1051.5	0.0	4999.8
2/1840	124.0	1180.0	163.4	186.2	27.9	1681.5
3/1840	793.4	174.8	0.0	577.3	122.6	1668.0
4/1840	1946.4	580.1	1786.8	1078.2	0.0	5391.6
5/1840	2036.9	595.7	358.4	421.4	358.5	3770.9
6/1840	781.2	300.3	0.0	259.7	0.0	1341.1
7/1840	910.0	141.1	268.0	351.1	0.0	1670.2
8/1840	1060.3	0.0	0.0	749.4	0.0	1809.7
9/1840	1636.4	89.1	284.0	306.1	41.3	2356.8
10/1840	979.9	506.7	360.4	331.7	163.2	2342.0
11/1840	525.3	584.9	0.0	1072.2	303.5	2485.9

12/1840	1168.1	1015.7	371.8	651.9	123.8	3331.3
1/1841	506.7	2828.8	495.1	1051.4	0.0	4881.9
2/1841	487.9	1865.8	0.0	648.2	0.0	3001.9
3/1841	1190.7	548.8	0.0	1102.5	103.4	2945.4
4/1841	995.1	1011.1	571.5	808.2	544.5	3930.3
5/1841	1809.0	488.7	1260.3	369.5	674.9	4602.5
6/1841	552.6	640.1	315.7	391.7	0.0	1900.1
7/1841	1556.0	502.3	282.6	286.5	242.0	2869.3
8/1841	1896.2	99.5	188.2	403.9	1098.9	3686.7
9/1841	722.3	1014.9	217.5	621.0	0.0	2575.7
10/1841	529.6	1724.2	271.4	335.8	46.3	2907.4
11/1841	0.0	533.9	0.0	128.8	0.0	662.8
12/1841	892.7	877.7	0.0	103.1	0.0	1873.4
1/1842	84.1	503.5	412.9	150.1	0.0	1150.6
2/1842	250.1	346.0	385.6	116.9	0.0	1098.5
3/1842	635.2	1017.4	303.3	671.6	0.0	2627.4
4/1842	606.7	74.6	1643.9	397.8	398.9	3121.9
5/1842	1828.3	1128.8	1842.4	357.7	0.0	5157.3
6/1842	2031.0	310.9	890.8	59.0	0.0	3291.6
7/1842	3018.2	667.8	680.8	855.1	405.1	5627.0
8/1842	1900.1	568.4	805.0	193.9	193.3	3660.8
9/1842	2534.4	749.8	731.3	467.2	730.3	5213.0
10/1842	780.8	552.5	0.0	330.5	1036.3	2700.0
11/1842	43.1	754.1	0.0	330.7	0.0	1127.9
12/1842	965.9	686.5	0.0	126.9	0.0	1779.3
1/1843	653.2	2648.4	547.3	385.8	0.0	4234.8
2/1843	0.0	508.9	0.0	278.2	83.2	870.2
3/1843	1023.9	3547.5	0.0	560.0	57.2	5188.5
4/1843	630.5	606.3	362.1	320.2	579.8	2498.8
5/1843	1050.6	820.9	0.0	545.8	0.0	2417.4
6/1843	3989.1	2051.2	672.8	1001.0	1118.7	8832.8
7/1843	2917.0	457.9	157.9	1402.4	0.0	4935.2
8/1843	3009.5	680.6	0.0	183.0	988.0	4861.0
9/1843	1902.0	92.3	0.0	52.9	536.2	2583.3
10/1843	857.9	663.2	0.0	342.3	53.7	1917.2
11/1843	1439.7	1485.7	144.3	831.3	270.7	4171.8
12/1843	444.3	1611.9	0.0	99.4	902.2	3057.7
1/1844	1111.6	0.0	0.0	507.7	0.0	1619.2
2/1844	629.0	2515.3	705.8	486.3	1213.0	5549.4
3/1844	0.0	948.2	1743.9	326.3	6.4	3050.3
4/1844	1044.6	1545.6	593.9	732.4	11.9	3928.4
5/1844	632.9	1128.6	0.0	633.8	2.9	2398.2
6/1844	4081.8	912.2	320.6	228.8	483.6	6026.9

7/1844	2921.8	277.9	334.8	160.8	0.0	3695.3
8/1844	2209.4	196.2	0.0	107.3	92.8	2605.6
9/1844	1655.2	1631.7	0.0	0.0	733.6	4020.5
10/1844	2561.8	2427.4	0.0	913.8	199.4	6102.3
11/1844	1305.0	1344.8	15.3	336.1	369.7	3370.9
12/1844	755.5	388.3	0.0	0.0	0.0	1143.8
1/1845	1506.5	2379.4	238.2	472.9	89.7	4686.7
2/1845	725.8	739.1	461.6	16.9	0.0	1943.4
3/1845	454.3	363.4	200.8	137.2	452.4	1608.1
4/1845	2168.4	828.6	1412.4	316.8	1988.7	6714.8
5/1845	1837.2	975.3	446.3	685.1	447.7	4420.2
6/1845	5651.3	1486.8	385.0	311.7	289.7	8124.4
7/1845	2635.3	1130.0	216.7	990.2	157.3	5129.4
8/1845	1876.5	1393.5	472.5	404.9	183.2	4330.5
9/1845	2598.1	1116.5	0.0	226.1	455.8	4396.4
10/1845	523.6	1995.1	0.0	568.3	0.0	3087.0
11/1845	1017.4	1828.2	0.5	293.3	20.3	3159.7
12/1845	440.2	2403.9	693.7	318.4	326.3	4182.5
1/1846	1161.0	3243.3	551.1	443.9	330.0	5729.2
2/1846	851.1	2295.2	610.7	483.4	851.8	5140.0
3/1846	1017.5	744.4	1145.9	640.3	33.4	3581.4
4/1846	862.4	1709.9	698.2	27.0	52.8	3350.4
5/1846	2626.7	1465.2	408.8	610.8	623.6	5735.0
6/1846	1220.6	674.7	1162.6	373.0	516.1	3946.8
7/1846	3623.7	1012.8	899.9	275.6	893.3	6705.4
8/1846	1092.1	423.2	0.0	355.2	327.9	2198.4
9/1846	1289.3	1656.4	661.2	303.9	523.5	4434.3
10/1846	498.2	2478.4	0.0	580.7	1658.0	5215.3
11/1846	825.8	2236.9	0.0	403.6	245.9	3712.2
12/1846	881.5	2080.3	340.9	850.4	998.8	5151.9
1/1847	1091.9	861.6	406.5	871.4	1650.5	4899.3
2/1847	1077.4	1552.3	599.2	1324.8	1384.9	5938.7
3/1847	1203.8	1144.9	1160.6	316.6	226.7	4052.6
4/1847	2475.0	1795.9	1240.9	1938.0	3588.4	11038.2
5/1847	2715.4	1029.3	821.3	1864.2	3381.2	9811.3
6/1847	4201.9	1010.0	769.3	3170.6	3828.0	12979.8
7/1847	2085.9	876.5	233.3	698.7	4086.5	7980.9
8/1847	2631.6	631.4	0.0	487.1	455.4	4205.5
9/1847	4231.1	2338.9	0.0	2185.8	1340.5	10096.3
10/1847	1523.4	1913.3	0.0	320.9	540.8	4298.4
11/1847	1527.4	1283.3	0.1	275.6	669.6	3756.0
12/1847	550.3	2908.0	454.2	1026.7	0.7	4939.9
1/1848	897.3	712.4	0.0	469.8	0.0	2079.5

2/1848	288.9	4023.2	0.0	460.1	0.0	4772.1
3/1848	1168.3	1764.5	594.8	385.1	951.7	4864.4
4/1848	423.7	624.6	200.7	1259.6	909.5	3418.2
5/1848	2062.5	1444.6	0.0	743.3	17.0	4267.4
6/1848	2940.2	1983.2	0.0	1109.7	176.3	6209.4
7/1848	2770.7	1050.3	310.3	371.0	1399.6	5901.9
8/1848	1655.1	138.8	0.0	762.5	187.2	3330.6
9/1848	2791.5	1447.2	0.0	1049.5	2245.8	7534.0
10/1848	605.3	1233.7	0.0	816.3	596.5	3251.8
11/1848	2009.0	2738.8	0.0	3067.8	632.1	8447.7
12/1848	210.7	2773.4	0.0	295.3	290.0	3623.8
1/1849	1645.7	3164.6	0.0	1546.6	332.0	6688.9
2/1849	284.3	838.6	538.7	896.0	336.3	2893.8
3/1849	509.3	819.1	673.7	596.7	681.7	3280.6
4/1849	498.9	755.8	765.9	961.5	233.5	3215.5
5/1849	4566.6	1283.7	2040.9	913.4	963.0	9871.1
6/1849	2395.6	140.8	217.1	184.8	180.8	3127.5
7/1849	3454.8	161.6	315.7	2149.1	1131.1	7212.2
8/1849	4375.2	1286.2	666.4	661.7	801.9	7791.4
9/1849	1512.9	2500.7	0.0	416.9	1880.4	6310.9
10/1849	1902.1	1143.6	0.0	1042.2	539.2	4627.1
11/1849	756.3	3541.5	0.0	682.7	0.0	4980.6
12/1849	767.1	3098.7	269.9	341.6	0.0	4477.3
1/1850	1497.1	3887.7	403.5	811.9	286.5	6886.6
2/1850	634.4	1161.6	952.0	173.3	580.9	3502.2
3/1850	798.4	709.6	0.0	493.8	0.0	2001.8
4/1850	2088.3	2431.5	842.4	820.3	221.9	6404.5
5/1850	2248.3	465.7	828.0	658.7	0.0	4200.7
6/1850	3618.9	29.0	423.1	996.8	1067.3	6135.1
7/1850	1503.4	151.3	0.0	13.3	179.4	1847.4
8/1850	2623.9	1197.0	687.6	745.8	1271.5	6525.8
9/1850	1699.6	2225.3	0.0	525.4	1132.3	5582.6
10/1850	1072.0	1656.2	339.8	617.3	877.7	4563.0
11/1850	828.2	3051.7	0.0	103.4	1045.0	5028.2
12/1850	145.3	2828.3	273.5	391.9	214.1	3853.1
1/1851	1046.0	1646.3	194.4	1132.6	514.8	4560.1
2/1851	616.5	2046.0	226.0	859.8	228.2	3976.5
3/1851	733.4	1699.6	400.3	672.8	764.0	4282.4
4/1851	1761.1	811.6	799.9	334.9	1721.4	5429.0
5/1851	2606.9	1409.4	1276.3	683.1	591.6	6567.2
6/1851	2877.2	1242.8	318.5	676.4	2741.2	7856.0
7/1851	3145.8	573.1	191.0	697.9	932.5	5540.4
8/1851	1947.9	2165.0	0.0	1377.8	442.5	5933.2

9/1851	1249.4	1540.2	293.9	268.4	630.9	3982.8
10/1851	2738.6	2140.8	638.8	865.0	1599.4	7982.5
11/1851	434.9	3007.8	0.0	55.5	708.0	4206.1
12/1851	1442.8	3819.7	255.1	179.1	486.7	6183.3
1/1852	1425.5	2239.1	437.9	1049.7	404.0	5556.1
2/1852	1303.4	959.8	253.8	43.5	777.2	3337.6
3/1852	505.7	639.3	0.0	75.4	0.0	1220.3
4/1852	1531.1	1210.6	1452.3	236.0	0.0	4430.0
5/1852	4098.0	566.4	1797.9	747.7	226.4	7436.4
6/1852	3647.9	0.0	306.6	713.3	201.9	4869.7
7/1852	3284.5	512.9	912.2	956.7	1573.0	7239.3
8/1852	3227.5	1088.1	0.0	885.7	610.1	5811.4
9/1852	2253.4	1495.0	0.0	71.1	239.1	4058.6
10/1852	1160.1	706.6	0.0	956.9	18.9	2842.4
11/1852	680.6	660.7	0.0	170.0	0.0	1511.3
12/1852	1616.8	2991.3	262.9	763.4	1618.0	7252.4
1/1853	1339.4	1597.8	265.1	1153.0	885.7	5241.0
2/1853	0.0	583.9	0.0	310.2	439.4	1333.4
3/1853	1446.1	1951.4	781.6	769.9	265.1	5214.2
4/1853	1357.7	388.5	0.0	2055.6	658.2	4459.9
5/1853	2778.2	531.2	601.3	351.3	657.9	4919.8
6/1853	4243.5	937.8	445.3	2135.0	749.2	8510.7
7/1853	1946.9	623.0	304.5	2524.1	1334.7	6733.3
8/1853	3611.5	862.3	490.4	932.1	1407.3	7303.7
9/1853	2932.3	1206.4	0.0	2104.0	529.5	7238.5
10/1853	750.7	1088.5	0.0	1374.2	605.2	3818.6
11/1853	1035.7	1525.9	0.0	339.6	0.4	3094.9
12/1853	532.2	1112.4	0.0	1177.7	675.0	3497.3

Monthly sugar imports to the port of New York, metric tons, 1/1827-12/1848.

	Brazil	Spanish West Indies	Philippines	Danish West Indies	Other	Total
1/1827	0.0	128.3	0.0	8.7	2720.0	2857.0
2/1827	0.0	340.7	0.0	87.6	2316.9	2745.2
3/1827	0.0	299.3	0.0	1054.9	1355.6	2709.7
4/1827	385.4	269.9	0.0	383.8	1409.0	2448.0
5/1827	430.5	1275.4	0.0	1259.1	1557.8	4522.9
6/1827	182.5	318.1	0.0	675.0	72.3	1248.0
7/1827	246.2	951.1	0.0	781.3	6.0	1984.5
8/1827	0.0	18.5	0.0	475.4	14.6	508.5
9/1827	0.0	276.7	0.0	231.6	100.7	608.9
10/1827	0.0	245.9	0.0	465.8	145.9	857.5
11/1827	5.9	155.7	0.0	0.0	140.4	302.1
12/1827	0.0	81.8	0.0	69.2	342.2	493.2
1/1828	0.0	533.2	0.0	0.0	3002.1	3535.3
2/1828	0.0	21.2	0.0	472.2	2561.9	3055.3
3/1828	0.0	320.9	0.0	588.7	3179.2	4088.7
4/1828	6.0	221.0	126.6	420.0	2309.9	2956.8
5/1828	31.0	323.3	0.0	447.4	520.1	1321.8
6/1828	209.0	328.6	0.0	937.2	368.6	1843.3
7/1828	498.3	237.7	0.0	313.3	195.6	1244.9
8/1828	0.0	138.6	0.0	479.9	188.7	807.3
9/1828	0.0	196.8	0.0	313.1	306.9	816.8
10/1828	17.5	148.5	0.0	158.0	554.2	878.2
11/1828	0.0	433.3	0.0	21.4	528.4	983.0
12/1828	148.9	260.9	0.0	10.5	658.3	1078.6
1/1829	38.6	44.5	328.2	234.2	3328.4	3645.6
2/1829	0.0	4.4	0.0	322.5	2615.9	2942.7
3/1829	499.6	392.1	0.0	1018.5	6642.1	8552.2
4/1829	0.0	97.5	523.8	965.8	3234.6	4297.9
5/1829	97.8	348.3	0.0	574.4	1208.8	2229.3
6/1829	0.0	284.2	0.0	855.9	1408.2	2548.4
7/1829	152.3	213.4	0.0	966.5	390.4	1722.5
8/1829	47.0	231.0	0.0	312.0	353.1	943.1
9/1829	0.0	270.6	0.0	0.0	193.6	464.1
10/1829	0.0	47.3	0.0	0.0	1307.1	1354.4
11/1829	0.0	391.5	0.0	0.0	739.3	1130.8
12/1829	0.0	332.0	0.0	0.0	248.1	580.1
1/1830	0.0	302.5	0.0	0.0	337.6	640.1
2/1830	189.2	348.5	0.0	0.0	786.6	1324.2

3/1830	0.0	679.0	204.8	681.8	1627.1	2987.9
4/1830	37.9	709.4	0.0	661.7	1509.9	2918.9
5/1830	39.8	1116.7	0.0	798.0	1252.0	3206.5
6/1830	362.1	1595.7	0.0	1022.9	866.2	3846.9
7/1830	280.6	536.4	0.0	523.9	387.5	1728.4
8/1830	407.9	1216.7	0.0	923.8	100.5	2648.8
9/1830	0.0	1590.8	82.1	389.6	278.4	2258.8
10/1830	226.8	2333.4	0.0	312.5	490.0	3362.6
11/1830	326.9	1967.3	0.0	357.8	367.0	3019.0
12/1830	39.8	1840.4	0.0	284.7	1311.0	3475.8
1/1831	0.0	344.6	0.0	228.6	1195.8	1769.0
2/1831	237.3	614.5	0.0	215.1	3172.7	4239.6
3/1831	288.1	672.6	222.5	936.9	2546.5	4444.0
4/1831	207.4	586.1	401.6	1008.3	1606.8	3408.6
5/1831	708.9	2075.1	0.0	1308.6	2611.0	6703.5
6/1831	0.0	547.3	0.0	676.1	1516.7	2740.1
7/1831	36.7	635.4	0.0	1046.4	2312.3	4030.8
8/1831	52.9	254.9	0.0	346.9	1315.4	1970.1
9/1831	0.0	724.6	0.0	17.0	614.4	1356.0
10/1831	2.2	533.7	0.0	107.7	953.6	1597.2
11/1831	0.0	759.5	0.0	0.0	396.3	1155.9
12/1831	39.2	1412.4	0.0	97.6	437.6	1986.9
1/1832	0.0	242.7	168.8	54.4	1431.3	1728.3
2/1832	0.0	323.8	456.8	109.0	679.3	1112.1
3/1832	0.0	328.9	0.0	865.5	2209.0	3403.5
4/1832	0.0	233.0	0.0	618.3	3942.4	4793.7
5/1832	0.0	494.2	0.0	1097.3	3769.1	5360.6
6/1832	0.0	469.5	148.6	778.8	1291.8	2540.1
7/1832	102.6	655.1	0.0	426.3	246.6	1430.5
8/1832	0.0	66.0	0.0	196.0	167.3	429.3
9/1832	0.0	267.7	0.0	0.0	419.7	687.4
10/1832	0.0	192.5	0.0	0.0	492.6	685.1
11/1832	0.0	416.1	0.0	108.7	160.4	685.2
12/1832	0.0	264.9	0.0	0.0	110.1	375.0
1/1833	0.0	341.4	0.0	0.0	1437.4	1778.9
2/1833	263.9	179.5	0.0	171.9	1161.7	1776.9
3/1833	240.7	357.8	150.0	632.5	961.8	2192.8
4/1833	423.7	491.3	0.0	1007.0	1632.1	3554.1
5/1833	130.1	2098.8	0.0	856.3	2990.6	6075.7
6/1833	0.0	1107.5	477.4	222.8	1102.6	2432.8
7/1833	300.3	1010.0	0.0	943.5	414.4	2668.1
8/1833	462.6	1577.8	0.0	315.7	251.6	2607.6
9/1833	540.4	1174.6	0.0	284.8	514.1	2514.0

10/1833	1095.6	2325.3	306.4	306.8	690.6	4418.4
11/1833	210.0	478.1	0.0	0.0	174.3	862.4
12/1833	0.0	172.9	0.0	0.0	140.7	313.6
1/1834	0.0	495.5	0.0	13.8	424.4	933.6
2/1834	0.0	471.7	531.3	583.3	874.4	1929.4
3/1834	0.0	1128.3	0.0	1142.8	1192.9	3463.9
4/1834	0.0	1086.5	0.0	1290.5	1339.9	3716.8
5/1834	452.9	1075.7	201.7	1277.3	900.9	3706.8
6/1834	820.3	2024.8	0.0	1149.9	1072.8	5067.8
7/1834	289.8	830.9	0.0	588.5	625.7	2334.8
8/1834	0.0	603.7	0.0	742.1	1187.3	2533.1
9/1834	0.0	762.2	0.0	316.7	932.1	2011.1
10/1834	142.8	528.1	156.3	89.8	647.4	1408.1
11/1834	0.0	318.7	0.0	521.9	458.7	1299.3
12/1834	0.0	338.8	427.4	34.1	1706.1	2078.9
1/1835	210.0	165.2	0.0	22.1	3265.8	3663.1
2/1835	0.0	284.8	0.0	126.9	1982.6	2394.3
3/1835	50.6	820.3	0.0	504.1	3767.4	5142.3
4/1835	104.3	2985.8	0.0	1613.6	4877.9	9581.6
5/1835	34.7	3130.6	226.9	680.1	285.6	4130.9
6/1835	778.0	2003.3	0.0	641.5	289.4	3712.2
7/1835	0.0	434.5	0.0	473.1	1488.0	2395.5
8/1835	0.0	2217.2	156.3	384.5	812.5	3414.1
9/1835	0.0	406.7	433.4	221.1	1363.8	1991.6
10/1835	365.1	577.5	0.0	84.8	547.3	1574.6
11/1835	107.2	801.5	780.6	91.9	897.4	1897.9
12/1835	0.0	355.3	1108.8	70.3	1272.8	1698.4
1/1836	0.0	477.3	0.0	0.0	237.5	714.7
2/1836	700.4	88.2	0.0	94.5	67.8	950.9
3/1836	874.1	758.1	531.8	504.9	1476.4	3613.4
4/1836	208.9	2668.4	486.4	1266.2	2117.3	6260.8
5/1836	687.4	3680.0	767.4	817.2	1713.0	6897.5
6/1836	369.3	1238.4	462.4	1183.9	1810.8	4602.5
7/1836	1073.8	1037.2	1016.3	811.6	1631.1	4553.8
8/1836	1240.7	317.9	430.9	541.6	1203.6	3303.9
9/1836	250.7	584.8	680.6	891.5	1076.8	2803.8
10/1836	0.2	580.6	0.0	130.9	749.1	1460.8
11/1836	0.0	893.6	213.1	131.5	1161.8	2186.9
12/1836	125.1	506.0	1231.6	94.7	1908.1	2633.9
1/1837	0.0	62.7	0.0	0.0	1014.2	1076.9
2/1837	0.0	480.1	361.4	265.3	1071.1	1816.5
3/1837	53.4	914.2	0.0	511.0	2099.3	3577.8
4/1837	170.0	1753.3	770.4	826.9	2503.0	5253.2

5/1837	0.0	2228.4	884.7	674.5	2118.4	5021.3
6/1837	0.0	984.2	807.1	316.2	1491.4	2791.8
7/1837	0.0	775.0	0.0	129.3	607.3	1511.7
8/1837	0.0	1387.0	0.0	256.7	1229.7	2873.3
9/1837	0.0	472.7	0.0	177.5	1557.3	2207.6
10/1837	0.0	133.8	0.0	152.3	1563.2	1849.3
11/1837	32.6	1204.9	74.0	120.3	1228.6	2586.4
12/1837	1.1	882.2	0.0	0.0	1126.6	2009.8
1/1838	0.0	281.5	0.0	0.0	906.9	1188.4
2/1838	0.0	415.1	0.0	0.0	610.6	1025.7
3/1838	411.9	866.7	0.0	743.7	1587.2	3609.4
4/1838	306.6	1513.4	0.0	1448.2	2987.6	6255.8
5/1838	189.2	2054.7	0.0	762.9	1086.2	4093.0
6/1838	0.0	1428.0	0.0	1114.4	890.0	3432.3
7/1838	0.0	1124.3	0.0	704.0	1066.3	2894.5
8/1838	0.0	1344.1	0.0	2088.6	561.1	3993.8
9/1838	0.0	1368.5	0.0	1051.4	806.5	3226.4
10/1838	0.0	1241.5	0.0	173.2	904.7	2319.3
11/1838	0.0	979.1	350.5	489.4	1027.2	2495.6
12/1838	0.0	830.2	425.3	11.2	1105.4	1946.8
1/1839	0.0	66.5	0.0	0.0	1601.5	1667.9
2/1839	0.0	195.5	667.7	499.7	2241.3	2936.5
3/1839	0.0	932.3	0.0	1579.0	1592.9	4104.2
4/1839	0.0	2214.6	45.9	1118.1	1844.7	5177.4
5/1839	0.0	1068.9	0.0	845.6	1669.6	3584.1
6/1839	0.0	1770.0	0.0	1117.1	2090.7	4977.8
7/1839	0.0	1325.6	0.0	597.5	1141.2	3064.4
8/1839	769.1	998.2	0.0	772.6	2440.3	4980.2
9/1839	0.0	418.0	546.8	170.1	2347.7	2935.8
10/1839	0.0	701.0	609.4	0.0	1287.1	1988.1
11/1839	0.0	441.8	0.0	0.0	220.5	662.3
12/1839	0.0	484.0	0.0	0.0	568.3	1052.3
1/1840	192.4	534.8	0.0	0.0	2324.5	3051.7
2/1840	0.0	169.7	0.0	622.8	1378.7	2171.2
3/1840	0.0	826.3	0.0	452.4	1942.2	3220.9
4/1840	0.0	655.8	0.0	856.9	1781.8	3294.4
5/1840	557.2	981.1	0.0	426.8	2127.7	4092.9
6/1840	0.0	297.6	0.0	744.5	4962.9	6005.0
7/1840	85.2	1747.3	0.0	974.2	1831.1	4637.9
8/1840	176.1	549.7	0.0	305.8	1494.5	2526.0
9/1840	0.0	694.4	0.0	244.3	1832.9	2771.6
10/1840	0.0	1453.7	452.2	0.0	1243.1	2696.8
11/1840	0.4	1392.0	0.0	0.0	2110.1	3502.4

12/1840	0.0	592.4	0.0	0.0	2076.6	2669.0
1/1841	0.0	718.7	0.0	0.0	2697.7	3416.4
2/1841	417.5	514.3	943.2	0.0	2865.3	3797.0
3/1841	0.0	2622.2	0.0	289.4	3824.5	6736.2
4/1841	469.6	2808.0	0.0	790.0	2570.7	6638.2
5/1841	699.3	1580.7	0.0	1234.6	2470.2	5984.8
6/1841	386.4	1897.4	0.0	1064.5	1806.4	5154.6
7/1841	201.6	974.4	0.0	234.5	1645.5	3056.0
8/1841	0.0	974.0	0.0	495.1	1145.5	2614.6
9/1841	348.4	1303.5	0.0	70.7	1949.5	3672.1
10/1841	72.7	1078.7	0.0	0.0	951.7	2103.2
11/1841	0.0	348.3	0.0	121.1	1402.5	1871.8
12/1841	0.0	588.7	0.0	0.0	1016.4	1605.1
1/1842	0.0	1405.8	0.0	2.9	1739.4	3148.0
2/1842	0.0	454.3	0.0	127.4	1214.1	1795.8
3/1842	776.4	1251.6	0.0	594.0	3259.1	5881.1
4/1842	486.5	2764.0	458.8	525.8	2657.2	6433.5
5/1842	589.7	1941.7	0.0	693.7	1319.1	4544.1
6/1842	297.5	3676.5	557.7	304.1	2063.2	6341.3
7/1842	0.0	1315.8	0.0	257.9	1614.0	3187.6
8/1842	0.0	1193.2	271.9	0.0	1780.0	2973.2
9/1842	0.0	360.3	0.0	0.0	1123.1	1483.4
10/1842	0.0	64.5	0.0	0.0	630.1	694.6
11/1842	0.0	1137.8	0.0	0.0	1101.9	2239.6
12/1842	0.0	187.6	0.0	0.0	2174.5	2362.1
1/1843	0.0	564.4	0.0	0.0	4123.4	4687.8
2/1843	0.4	185.1	194.7	0.0	2873.8	3059.2
3/1843	0.0	556.3	0.0	99.2	3578.4	4233.9
4/1843	0.0	719.8	286.3	273.4	5193.1	6186.3
5/1843	92.4	1651.2	343.1	841.9	5492.0	8077.5
6/1843	0.0	2851.9	0.0	1040.3	2204.1	6096.4
7/1843	0.0	1908.5	0.0	299.1	878.7	3086.2
8/1843	0.4	1428.0	0.0	212.4	842.0	2482.8
9/1843	0.0	1167.9	0.0	65.6	599.6	1833.1
10/1843	0.0	1570.5	0.0	168.5	854.0	2593.1
11/1843	0.0	696.3	0.0	0.4	1564.5	2261.2
12/1843	0.0	955.8	0.0	0.7	626.8	1583.4
1/1844	0.0	492.0	0.0	0.0	1837.8	2329.7
2/1844	0.0	1484.5	0.0	0.0	2882.1	4366.6
3/1844	0.0	2888.3	0.0	0.0	2791.4	5679.7
4/1844	0.0	5856.2	0.0	357.5	1377.4	7591.1
5/1844	0.0	11069.6	0.0	522.6	1430.5	13022.7
6/1844	0.0	4657.8	0.0	139.9	1586.9	6384.6

7/1844	0.0	2870.0	0.0	371.1	169.9	3410.9
8/1844	0.4	690.5	357.8	499.4	884.9	2075.1
9/1844	0.4	1112.0	0.0	264.5	765.0	2141.8
10/1844	0.0	490.9	0.0	71.3	1346.9	1909.0
11/1844	0.0	871.2	415.3	134.1	2846.8	3852.1
12/1844	0.0	61.2	0.0	0.0	3293.2	3354.5
1/1845	0.0	141.4	427.4	0.0	3790.6	3932.0
2/1845	0.4	0.0	0.0	137.0	4128.3	4265.6
3/1845	0.0	0.0	0.0	141.5	10600.8	10742.3
4/1845	0.0	309.5	0.0	390.7	12411.6	13111.7
5/1845	0.0	1973.3	0.0	1061.9	9833.1	12868.2
6/1845	98.0	1079.0	151.3	772.9	1570.7	3520.6
7/1845	0.0	141.8	429.5	870.8	1577.6	2590.1
8/1845	0.0	129.9	554.4	936.0	1122.8	2188.8
9/1845	163.7	544.8	0.0	92.0	1233.1	2033.6
10/1845	0.0	137.8	0.0	108.2	636.1	882.1
11/1845	0.0	334.6	0.0	0.4	2384.8	2719.7
12/1845	0.0	947.1	0.0	0.0	2199.1	3146.2
1/1846	14.0	444.0	0.0	0.0	2790.6	3248.6
2/1846	0.0	525.7	0.0	0.0	4271.1	4796.7
3/1846	0.0	615.0	0.0	0.0	7111.6	7726.5
4/1846	0.7	2703.4	366.4	227.0	4219.1	7150.2
5/1846	0.0	3399.1	0.0	574.8	4721.9	8695.7
6/1846	0.0	4982.8	0.0	293.1	2124.2	7400.1
7/1846	0.0	2131.9	0.0	254.7	1845.8	4232.3
8/1846	0.0	2260.2	0.0	214.2	1654.2	4128.5
9/1846	0.7	1616.4	0.0	0.0	2229.4	3846.4
10/1846	0.7	1363.9	0.0	0.0	1097.1	2461.7
11/1846	0.0	1050.7	0.0	14.5	432.7	1497.9
12/1846	0.0	2352.7	0.0	0.0	2509.3	4862.0
1/1847	0.0	3278.3	0.0	91.8	3230.3	6600.4
2/1847	0.0	2423.3	0.0	166.8	2269.7	4859.7
3/1847	150.2	5118.8	0.0	758.7	2184.8	8212.4
4/1847	0.0	7518.6	187.6	1055.3	2214.5	10788.5
5/1847	0.0	7438.2	0.0	772.0	2325.5	10535.7
6/1847	0.0	5259.8	0.0	906.4	955.0	7121.2
7/1847	0.0	7544.6	0.0	203.1	661.2	8408.9
8/1847	0.0	5194.9	0.0	113.5	2008.6	7316.9
9/1847	0.0	5267.6	0.0	113.0	923.3	6303.8
10/1847	0.0	4033.2	0.0	0.0	1096.1	5129.2
11/1847	0.4	1856.1	0.0	0.0	2577.4	4433.9
12/1847	0.0	1111.3	396.8	0.0	3248.4	4359.7
1/1848	0.0	686.4	383.8	0.0	4516.0	5202.4

2/1848	0.0	986.1	0.0	0.0	4273.1	5259.2
3/1848	0.0	5198.3	487.1	0.0	7592.8	12791.1
4/1848	0.5	7494.0	1076.5	84.6	6906.4	14485.4
5/1848	0.4	8760.9	1155.5	434.5	5424.5	14620.2
6/1848	0.0	4886.1	379.9	108.9	2506.8	7501.7
7/1848	540.8	5292.6	596.3	264.1	1950.3	8047.7
8/1848	0.7	6600.4	0.0	133.4	757.3	7491.8
9/1848	0.0	5107.6	0.0	57.3	3200.4	8365.3
10/1848	0.0	3457.1	0.0	0.0	1319.0	4776.0
11/1848	0.0	4057.6	0.0	33.6	1048.0	5139.1
12/1848	0.0	1726.3	269.4	0.0	3233.0	4959.3

Imports (cwts) of Brazilian sugar, 1827-1860.

	United Kingdom	United States	Hamburg	France
1827	77202	47937		
1828	97393	33485		
1829	85203	50757		
1830	94550	63136		
1831	362621	53970	477878	793
1832	147315	9454	411411	35
1833	198198	56085	354136	554
1834	79135	60859	180634	1296
1835	81348	71160	222856	1180
1836	176151	248658	270440	2041
1837	110216	29352	277121	4017
1838	86515	70402	340003	2841
1839	197510	87935	321148	75
1840	215962	48333	310950	5962
1841	365663	81076	210991	35051
1842	260068	60913	249962	23893
1843	234155	17099	181092	6627
1844	271415	24992	182516	24763
1845	325359	55878	256169	18063
1846	300509	43985	211519	32842
1847	699201	61575	156320	27347
1848	652024	53604	148297	59830
1849	561660	84964	130360	76073
1850	362686	62798	172622	121962
1851	720424	129979	138810	113726
1852	290701	164660	120474	146956
1853	671149	232155	121130	206325
1854	579303	97001	72248	238205
1855	468678	69930	93882	309992
1856	531176	109696	63432	163152
1857	850907	170551	51934	142460
1858	836325	90554	53239	113943
1859	1118597	264575	128403	316679
1860	432943	270447	21407	105462

4.6. Wholesale prices of muscovado sugar in New York ($/cwt) and Hamburg (groot/pfund), monthly, 1/1817 to 12/1850.

	New York			Hamburg		
	Cuba	Brazil	New Orleans	Havana	Brazil	Dutch East Indies
1/1817	14.7		15.3	12.8	11.5	11.0
2/1817	14.8		15.5	12.8	11.5	
3/1817	14.5		15.0	12.6	11.5	
4/1817	14.1		13.0	12.4	10.9	
5/1817	13.6		13.3	12.3	10.8	
6/1817	13.6		11.8	12.6	11.3	
7/1817	12.8	12.0	11.3	12.7	11.4	
8/1817	12.8	12.3	11.8	12.6	11.5	
9/1817	13.5	12.5	13.4	12.7	11.5	11.0
10/1817	13.5	12.5	13.3	12.8	11.5	11.5
11/1817	13.8	12.5	13.8	12.3	11.5	11.5
12/1817	13.3	12.5	13.8	12.0	11.0	11.3
1/1818	13.9	13.0	13.8	12.3	11.0	11.3
2/1818	13.5	13.0	12.9	12.3	11.0	
3/1818	13.3	13.0	12.3	12.8	11.3	11.5
4/1818	13.3	13.0	12.1		11.8	
5/1818	13.1	13.0	12.1		11.6	
6/1818	13.1	13.0	11.9	12.8	11.8	
7/1818	13.8	13.0	12.1	12.6	11.8	
8/1818	13.9	13.0	12.9	12.6	11.8	
9/1818	14.2	13.0	13.3			
10/1818	14.7	13.0	13.3			
11/1818	15.1	13.0	13.5	11.8	10.8	
12/1818	14.3	13.0	13.8	11.4	10.8	
1/1819	13.8	12.5	13.5	11.8	10.6	9.0
2/1819	13.8	12.5	13.5	11.3	10.4	9.3
3/1819	14.1	12.5	13.5	11.3	10.3	10.0
4/1819	14.1	12.5	13.3	10.8	10.0	10.0
5/1819	13.1	12.0	12.1	10.1	8.9	8.8
6/1819	12.6	12.0	12.1			
7/1819	11.4	10.3	10.2	10.6	9.4	8.0
8/1819	10.6	10.3	10.0	10.4	9.3	8.3
9/1819	11.1	10.9	11.4	10.0	9.0	7.5
10/1819	11.5	10.9	11.4	9.6	8.5	7.5
11/1819	11.8	10.9	11.8	9.4	8.4	7.5
12/1819	11.1	10.4	11.8	9.3	8.5	7.5

1/1820	11.4	10.4	11.3	9.2	8.3	7.3
2/1820	11.3	10.4	11.3	8.9	8.0	7.0
3/1820	10.8	10.4	9.9	9.2	8.3	7.2
4/1820	9.8	9.8	10.3	9.4	8.5	7.5
5/1820	9.7	9.3	9.5	9.3	8.3	7.3
6/1820	9.7	9.3	9.8	9.3	8.1	7.0
7/1820	9.5	9.0	9.5	9.8	8.8	7.0
8/1820	9.9	9.5	10.0	9.3	8.4	7.0
9/1820	8.7	8.3	8.8	9.2	8.3	6.9
10/1820	10.4	9.9	10.5			
11/1820	9.9	9.4	9.9	9.1	8.3	6.4
12/1820	9.8	9.3	9.8	9.2	8.1	6.4
1/1821	9.6	9.1	9.6	9.2	7.8	5.9
2/1821	9.9	9.5	10.0	9.0	7.6	5.5
3/1821	10.4	10.0	10.5	9.1	8.3	5.4
4/1821	8.9	8.5	9.0	8.9	7.9	5.4
5/1821	10.3	9.9	10.4	8.4	7.4	5.4
6/1821	9.1	8.7	9.2	8.4	7.6	5.4
7/1821	9.2	8.8	9.3	8.0	7.4	5.4
8/1821	10.2	9.7	10.2			
9/1821	9.1	8.7	9.2	6.9	6.3	4.3
10/1821	10.3	9.9	10.4	7.0	6.1	4.3
11/1821	10.0	9.5	10.0	6.8	5.8	4.3
12/1821	9.5	9.0	9.5	7.1	6.0	4.3
1/1822	9.8	9.5	10.0	7.3	6.3	4.3
2/1822	9.8	9.5	10.0	7.3	6.3	4.3
3/1822	9.5	9.5	10.0	7.3	6.3	4.3
4/1822	9.5	9.5	10.4	7.3	6.3	4.3
5/1822	9.5	9.5	10.3	7.0	6.0	
6/1822	9.4	9.5	10.0			
7/1822	9.0	9.0	10.0			
8/1822	9.0	9.0	9.8	6.5	5.6	4.3
9/1822	9.0	9.0	9.8			
10/1822	9.0	9.0	9.8			
11/1822	9.0	9.0	9.8			
12/1822	8.5	9.0	9.8			
1/1823	8.5	8.5	9.8	7.8	6.9	6.3
2/1823	8.7	8.5	9.8	9.5	8.7	
3/1823	8.7	8.5	9.8			
4/1823	8.8	8.5	8.4	9.6	9.1	
5/1823	8.8	8.5	8.4			
6/1823	8.9	8.5	8.5			
7/1823	9.5	8.5	8.5	8.0	7.6	

8/1823	9.5	8.8	8.5	7.8	6.8	
9/1823	9.5	8.8	8.5			
10/1823	9.5	8.8	9.5	7.0	6.3	
11/1823	9.8	8.8	9.5	7.3	6.3	
12/1823	8.5	8.8	9.8			
1/1824	9.1	8.8	9.4	7.1	6.3	
2/1824	8.9	8.8	8.8	7.0	6.3	
3/1824	9.4	8.8	9.0			
4/1824	9.4	8.8	9.0			
5/1824	9.5	8.8	9.0	6.5	5.6	
6/1824	9.3	8.8	9.0	7.0	6.3	
7/1824	9.1	8.8	8.8			
8/1824	9.3	8.8	8.8			
9/1824	9.3	8.8	8.8	6.9	6.1	
10/1824	9.3	8.8	8.8			
11/1824	9.1	9.0	8.8			
12/1824	9.0	9.0	8.8			
1/1825	8.9	8.5	8.8	7.6	6.8	
2/1825	8.0	7.5	7.5			
3/1825	8.3	8.3	7.5	9.5	8.6	
4/1825	9.1	8.5	8.5			
5/1825	9.9	9.5	8.8			
6/1825	9.7	9.5	8.3			
7/1825	9.7	9.5	8.3			
8/1825	10.1	10.0	8.5			
9/1825	11.1	10.5	10.0			
10/1825	10.9	11.0	10.0			
11/1825	10.4	11.0	9.5			
12/1825	10.0	10.1	9.0			
1/1826	9.9	11.0	9.0		8.3	
2/1826	9.0	10.6	8.0		7.8	
3/1826	8.9	9.0	7.8	8.1	7.0	
4/1826	9.0	8.8	8.5			
5/1826	9.3	8.5	8.5			
6/1826	8.6	8.5	8.0			
7/1826	8.5	8.0	8.0			
8/1826	8.4	8.0	7.8			
9/1826	8.4	8.0	7.8			
10/1826	9.0	8.8	9.0			
11/1826	9.3	8.8	9.0			
12/1826	9.1	8.8	9.0			
1/1827	9.0	8.8	8.0			
2/1827	8.8	8.5	7.8			

3/1827	8.5	8.5	8.0			
4/1827	9.1	8.8	8.3			
5/1827	9.1	8.8	7.8			
6/1827	9.0	8.8	7.8			
7/1827	9.0	8.3	7.8			
8/1827	9.3	8.6	8.3			
9/1827	9.3	8.6	8.3			
10/1827	9.8	9.3	9.0			
11/1827	9.9	9.3	8.5			
12/1827	10.0	9.3	8.5			
1/1828	10.0	9.3	8.5	9.0	7.6	
2/1828	9.9	9.3	7.4	8.8	7.6	
3/1828	9.9	9.3	7.3	9.0	7.5	
4/1828	9.9	9.6	8.0	8.9	7.6	
5/1828	9.3	9.6	7.6	8.8	7.5	
6/1828	9.2	9.3	7.6	8.8	7.4	
7/1828	9.2	9.3	8.0	8.7	7.3	
8/1828	9.4	9.0	8.0	8.4	7.3	
9/1828	9.6	9.3	8.8	8.3	6.9	
10/1828	9.5	9.3	9.0	8.1	6.5	
11/1828	9.4	9.3	8.8	8.1	6.8	
12/1828	9.2	9.3	8.3	7.9	6.5	
1/1829	8.8	8.8	8.3	7.8	6.1	
2/1829	8.7	8.8	7.3	7.8	6.1	
3/1829	8.7	8.5	7.3	7.6	6.0	
4/1829	8.8	8.5	7.8	7.0	5.8	
5/1829	8.4	8.1	7.6	6.9	5.8	
6/1829	8.4	7.9	7.1	6.9	5.8	
7/1829	8.4	7.9	6.9	7.0	5.7	
8/1829	8.4	7.9	7.6	6.7	5.6	
9/1829	8.5	7.9	7.8	6.6	5.5	
10/1829	8.6	7.9	7.6	6.5	5.4	
11/1829	8.6	7.9	7.5	6.5	5.4	
12/1829	8.4	7.9	7.4	6.5	5.4	
1/1830	8.2	7.9	7.5	6.5	5.4	
2/1830	7.9	7.9	7.8	6.5	5.4	
3/1830	8.1	7.8	8.4	6.5	5.4	
4/1830	8.0	7.8	8.0	6.3	5.1	
5/1830	8.0	7.8	8.0	6.1	4.9	
6/1830	7.9	7.4	7.0	6.0	4.7	
7/1830	7.9	7.4	7.3	5.8	4.5	
8/1830	7.9	7.3	7.3	5.6	4.4	
9/1830	7.9	7.3	7.8	5.8	4.4	

10/1830	7.9	7.3	7.8	5.9	4.5	
11/1830	7.3	7.3	7.6	5.6	4.3	
12/1830	7.3	6.5	7.5	5.4	4.3	
1/1831	7.0	6.5	6.3	5.4	4.3	
2/1831	6.6	5.5	6.0			
3/1831	6.4	5.5	6.0	5.9	4.6	
4/1831	6.5	5.6	6.9	6.0	4.9	
5/1831	6.4	5.6	6.0	5.9	4.9	
6/1831	6.4	5.6	6.0	5.6	4.6	
7/1831	6.3	5.6	5.3	5.4	4.6	
8/1831	6.3	5.6	5.5	5.5	4.6	
9/1831	6.3	5.6	6.0	5.5	4.5	
10/1831	6.5	5.6	6.3	5.5	4.5	
11/1831	6.5	5.6	6.0	5.5	4.5	
12/1831	6.4	5.6	6.0	5.5	4.5	
1/1832	6.3	5.6	5.9	5.8	4.8	
2/1832	6.3	5.6	5.9	5.8	4.8	
3/1832	6.8	5.9	6.8			
4/1832	7.0	6.5	6.8	6.0	5.5	
5/1832	7.0	6.5	6.8	6.6	5.8	
6/1832	7.1	6.5	6.0	6.6	5.8	
7/1832	7.3	6.5	6.0	6.4	5.6	
8/1832	7.2	6.5	6.3			
9/1832	7.5	6.5	6.8			
10/1832	7.6	6.5	7.1			
11/1832	7.6	6.5	7.4			
12/1832	7.6	6.8	7.4			
1/1833	7.4	6.8	7.3			
2/1833	7.3	6.8	5.8	5.9	4.9	
3/1833	7.3	6.8	6.5			
4/1833	7.8	7.3	6.5			
5/1833	7.7	7.3	6.5	5.6	4.9	
6/1833	7.6	7.3	6.5	5.6	4.9	
7/1833	7.8	7.3	6.5			
8/1833	8.1	7.3	7.3			
9/1833	9.3	8.5	8.8			
10/1833	9.1	8.6	9.1			
11/1833	7.8	7.8	8.0			
12/1833	7.7	7.0	7.5			
1/1834	7.8	7.0	7.6	6.4	5.4	
2/1834	7.6	7.0	6.8	6.4	5.6	
3/1834	7.5	7.0	6.8	6.4	5.7	
4/1834	7.5	7.0	6.5	6.3	5.7	

5/1834	7.2	7.0	5.5	6.3	5.7	
6/1834	7.2	7.0	6.0	6.1	5.4	
7/1834	7.1	7.0	5.8	6.1	5.5	
8/1834	7.4	7.0	6.8	6.2	5.5	
9/1834	7.7	7.0	6.9	6.3	5.5	
10/1834	7.9	7.0	6.9	6.4	5.6	
11/1834	7.9	7.3	7.0	6.6	5.8	
12/1834	8.2	7.3	7.0	6.7	5.9	
1/1835	8.0	7.3	6.8	6.8	6.0	
2/1835	7.9	7.3	6.8			
3/1835	8.0	7.3	7.3	7.1	6.3	
4/1835	8.5	7.8	7.3	7.1	6.3	
5/1835	8.5	7.8	7.3	7.1	6.3	
6/1835	8.3	7.8	7.1	7.1	6.3	
7/1835	8.6	8.5	8.0	7.5	6.4	
8/1835	8.8	8.5	8.3	8.2	7.0	
9/1835	8.9	8.3	8.1	8.3	7.2	
10/1835	9.0	8.5	8.5	8.2	6.9	
11/1835	9.2	8.5	8.5	7.8	6.7	
12/1835	9.2	8.5	8.5	7.6	6.6	
1/1836	9.4	8.5	9.5	8.2	6.8	
2/1836	9.8	8.5	9.4	8.2	6.8	
3/1836	10.7	9.8	10.9	8.1	6.8	
4/1836	11.4	10.8	11.3	8.4	7.1	
5/1836	11.3	10.6		8.6	7.4	
6/1836	9.3	9.5	9.3	8.6	7.4	
7/1836	9.4	9.0	8.8	8.5	7.4	
8/1836	9.7	9.0	8.8	8.1	7.0	
9/1836	9.8	8.9		8.0	6.9	
10/1836	9.5	8.5		7.5	6.2	
11/1836	8.8	7.9		7.1	5.7	
12/1836	7.4	7.5	7.4	7.0	5.6	
1/1837	7.4	7.6	7.6	7.0	5.6	
2/1837	7.4	7.5	7.0	6.3	5.4	
3/1837	8.4	7.9	7.9	6.3	5.2	
4/1837	8.3	7.3	7.4	6.4	5.3	
5/1837	6.8	6.8	6.3	6.4	5.3	
6/1837	7.1	7.4	6.3	6.4	4.8	
7/1837	7.6	8.2	6.0	6.1	4.7	
8/1837	7.8	7.6	6.3	5.8	4.5	
9/1837	7.7	7.4	6.3	5.8	4.5	
10/1837	7.8	8.3	6.4	6.0	4.5	
11/1837	8.6	7.5	8.0	6.3	4.7	

12/1837	8.3	7.4	8.1	6.6	4.8	
1/1838	7.6	7.2	6.8	6.6	4.9	
2/1838	7.7	7.5	7.3	6.8	5.2	
3/1838		7.2		7.1	5.7	
4/1838	7.5	7.9	6.6	7.3	5.7	
5/1838	7.2	7.1	6.5	6.8	5.6	
6/1838	7.1	8.0	6.5	6.6	5.5	
7/1838	7.2	7.5	6.5	6.5	5.3	
8/1838	7.2	7.7	6.8	6.3	5.1	
9/1838	7.9	7.5	8.0	6.5	5.0	
10/1838	8.2	7.5	7.9	6.5	5.1	
11/1838	8.2	7.5		6.5	5.3	
12/1838		7.6		6.5	5.3	
1/1839	8.2	7.3	7.1	6.0	5.4	
2/1839	8.3	7.1	6.9	6.0	5.4	
3/1839	8.3	7.9	7.4	6.0	5.5	
4/1839	8.1	7.5	7.1	6.0	5.5	
5/1839	7.5	7.5	7.1	6.0	5.5	
6/1839	7.5	7.0	7.1	5.7	5.5	
7/1839	7.8	7.9	7.0	5.6	5.4	
8/1839	7.9	7.7	7.0	5.6	5.3	
9/1839	7.8	7.5	7.0	5.7	5.3	
10/1839	7.8	7.5	7.0	5.7	5.4	5.4
11/1839	7.8	7.5	7.0	5.7	5.4	5.3
12/1839	7.4	6.8	6.8	5.5	5.4	5.3
1/1840	6.4	5.8	5.8	5.5	5.4	5.2
2/1840	6.8	5.8	5.8	5.4	5.3	5.1
3/1840	6.4	5.6	5.5	5.6	5.3	5.2
4/1840	6.4	5.6	5.5	5.5	5.3	5.3
5/1840	6.3	5.6	5.5	5.4	5.2	5.3
6/1840	6.3	5.8	5.4	4.8	4.7	4.9
7/1840	6.4	5.8	5.4	4.6	4.6	4.9
8/1840	6.8	5.8	6.0	5.2	4.9	5.0
9/1840	7.3	5.8	6.9	5.1	4.9	5.0
10/1840	7.4	6.5	7.1	5.0	4.6	5.0
11/1840	7.4	6.5	7.6	5.0	4.6	5.0
12/1840	7.5	6.5	7.3	4.7	4.4	5.0
1/1841	7.6	6.5	6.6	4.7	4.5	5.0
2/1841	7.5	6.5	7.5	4.8	4.7	5.0
3/1841	6.7	6.5	6.6	4.8	4.6	5.0
4/1841	6.6	6.5	6.5	4.8	4.6	5.0
5/1841	6.5	6.5	6.4	4.7	4.5	5.0
6/1841	6.4	6.5	5.6	4.6	4.5	5.0

7/1841	6.8	6.3	6.0	4.6	4.4	4.5
8/1841	6.8	6.0	6.3	4.6	4.5	4.5
9/1841	7.0	5.8	6.8	4.6	4.5	4.5
10/1841	7.2	5.5	6.9	4.6	4.3	4.5
11/1841	6.9	5.5	6.5	4.5	4.2	4.5
12/1841	6.7	5.5	5.8	4.5	4.1	4.5
1/1842	6.1	5.5	6.0	4.2	4.2	4.5
2/1842	4.9	5.1	5.3	4.2	4.2	4.5
3/1842	4.7	5.5	4.3	4.2	4.1	4.5
4/1842	4.8	4.8	4.0	4.1	4.1	4.1
5/1842	5.2	4.4	3.9	4.1	4.2	4.3
6/1842	5.4	4.5	3.9	3.9	3.9	4.3
7/1842	5.1	4.5	4.0	3.9	3.8	4.0
8/1842	4.8	4.8	4.0	3.9	3.6	3.8
9/1842	5.6	5.4	5.0	3.8	3.7	3.8
10/1842	5.9	5.0	5.3	3.8	3.8	3.8
11/1842	6.3	5.0	5.5	3.8	3.9	3.8
12/1842	5.9	5.0	5.5	4.3	4.1	
1/1843	5.4	5.0	4.4	4.5	4.4	
2/1843	5.5	5.0	4.8	4.6	4.6	
3/1843	5.6		4.8	5.1	5.2	
4/1843	5.8		5.0	5.5	5.4	
5/1843	6.6		5.1	4.7	4.8	
6/1843	6.6		5.3	4.5	4.5	
7/1843	7.0		5.9	4.5	4.6	
8/1843	7.5		6.4	4.3	4.3	
9/1843	7.4		7.1	4.3	4.3	
10/1843	7.3		6.6	4.3	4.3	
11/1843	7.1		6.6	4.3	4.1	
12/1843	6.8		6.5	4.3	4.2	
1/1844	6.7		6.7	4.3	4.2	4.2
2/1844	7.1		6.8	4.3	4.2	4.2
3/1844	7.0		6.4	4.3	4.2	4.3
4/1844	7.1		7.3	4.5	4.4	4.3
5/1844	7.1		7.0	4.5	4.4	4.3
6/1844	6.8		6.8	4.5	4.4	4.3
7/1844	6.7		6.4	4.5	4.4	4.4
8/1844	6.7		6.3	4.5	4.4	4.4
9/1844	6.5		6.4	4.5	4.4	4.4
10/1844	6.8		6.5	4.6	4.4	4.4
11/1844	6.9		6.5	4.8	4.8	4.4
12/1844	6.5		5.8	5.0	4.9	4.8
1/1845	6.5		4.4	5.2	5.0	5.0

2/1845	6.0		4.7	5.2	5.0	5.0
3/1845	6.6		5.5	5.2	5.0	5.0
4/1845	8.8		6.8	5.2	5.0	5.0
5/1845	7.6		6.1	5.3	5.1	5.3
6/1845	7.1		5.8	5.8	5.5	5.7
7/1845	7.3	8.0	6.0	5.9	5.7	5.7
8/1845	7.6	8.0	6.6	6.3	5.9	6.1
9/1845	7.9	8.0	7.4	6.6	6.4	6.5
10/1845	8.0	8.3	7.0	6.4	6.1	6.5
11/1845	8.1		7.1	5.8	5.9	5.8
12/1845	7.3		6.3	5.8	5.9	5.8
1/1846	7.1		6.3	5.8	5.8	5.5
2/1846	7.1		5.9	5.5	5.4	5.4
3/1846	7.1		6.0	5.5	5.2	5.3
4/1846	7.1		6.3	5.0	5.1	5.0
5/1846	7.0		6.5	4.8	4.7	4.6
6/1846	7.0		6.3	4.7	4.7	4.6
7/1846	7.0		6.3	5.3	5.2	5.1
8/1846	6.9		6.5	5.0	5.1	4.9
9/1846	7.0		6.6	5.3	5.0	4.9
10/1846	7.7		7.8	5.1	4.9	4.9
11/1846	8.1		7.5	4.9	4.8	4.9
12/1846	7.7		7.8	5.3	5.0	4.9
1/1847	7.1		7.1	5.3	5.0	4.9
2/1847	6.8		6.8			
3/1847	7.6		7.8	6.3	5.7	
4/1847	7.2		7.5	6.8		
5/1847	7.0		7.0	5.9	5.9	
6/1847	6.7		6.8	5.8	5.8	5.8
7/1847	6.6		6.8		5.0	4.8
8/1847	6.6		6.8	5.2	4.8	4.9
9/1847	6.9		6.8	5.4	5.0	5.1
10/1847	6.7		6.8	5.4	5.4	5.5
11/1847	6.3		6.1	5.1	4.6	4.9
12/1847	5.7		5.8	4.7	4.4	4.8
1/1848	5.2		5.0	4.5	4.2	4.6
2/1848	5.3		4.6	4.5	4.3	4.6
3/1848	5.3		4.6	4.5	4.3	4.6
4/1848	5.1		4.5	3.8	3.9	4.6
5/1848	4.9		4.0	3.7	3.8	3.9
6/1848	4.9		3.6	3.6	3.6	3.9
7/1848	4.6		3.7	3.5	3.5	3.9
8/1848	4.6		3.8	3.9	3.8	

9/1848	4.6		4.1	3.9	3.8	
10/1848	5.2		5.0	3.9	3.9	4.0
11/1848	4.8		4.4	3.8	3.8	3.5
12/1848	4.5		4.4	3.8	3.8	
1/1849	4.6		4.5	4.2	4.1	
2/1849	4.9		4.8	4.4	4.5	
3/1849	5.3		4.9	4.9	4.8	
4/1849	5.3		5.1	5.1	4.9	
5/1849	5.3		4.9	5.0		
6/1849	5.0		4.6	5.1	5.0	
7/1849	5.1		4.6	5.1		
8/1849	5.3		4.6	4.8	4.7	
9/1849	5.4		5.1	4.7	4.8	5.3
10/1849	5.9		5.6	4.6	4.4	
11/1849	5.9		5.4	4.6	4.5	
12/1849	5.5		5.5	4.5	4.3	
1/1850	5.4		4.8	4.8	4.7	
2/1850	5.5		5.0	4.8	4.7	
3/1850	5.6		4.8	4.4	4.3	
4/1850	5.4		4.6	4.3	4.0	5.2
5/1850	5.4		4.8	4.0	3.9	
6/1850	5.4		4.8	4.1	4.2	
7/1850	5.9		5.3	4.2	3.9	
8/1850	6.2		5.9	4.0	3.9	4.3
9/1850	6.5		6.5	4.3	4.4	4.4
10/1850	6.7		6.8	4.7	4.7	
11/1850	6.7		6.8	4.7	4.4	
12/1850	6.3		6.3	4.6		

5.1. Volume (metric tons) of coffee and sugar exported from Rio de Janeiro, 6/1826 to 12/1840.

Country code: AFR: Africa; AUST: Australia; BEL: Belgium; DEN: Denmark; FRA: France; GER: Germany; GRE: Greece; IND: India; ITA: Italy; AUS: Austria; RIO: Rio de la Plata; CHI: Chile; NET: Netherlands; NOR: Norway; POR: Portugal; SWE: Sweden; USA: United States; UK: United Kingdom; SPA: Spain; OTH: Other; TOT: Total; TOT3: Total, 3-month moving average.

Coffee											
	AFR	AUST	BEL	DEN	FRA	GER	GRE	IND	ITA	AUS	RIO
1/1826	0.0	0.0	0.0	0.0	0.0	81.2	0.0	0.0	0.0	0.0	0.0
2/1826											
3/1826											
4/1826											
5/1826											
6/1826											
7/1826	14.7	0.0	103.4	26.4	243.4	75.6	0.0	0.0	0.0	0.0	0.9
8/1826	9.6	0.0	240.3	0.0	86.9	274.7	0.0	0.0	0.0	139.6	0.0
9/1826	0.0	0.0	256.6	0.0	51.6	362.5	0.0	0.0	20.5	0.0	0.7
10/1826	1.5	0.0	824.6	0.0	66.6	0.0	0.0	0.0	0.0	248.3	5.6
11/1826	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12/1826	0.0	0.0	84.8	0.0	0.0	234.2	0.0	0.0	0.0	210.4	1.0
1/1827	0.1	0.0	0.0	0.0	0.0	557.6	0.0	0.0	0.0	229.9	2.6
2/1827	22.6	0.0	224.0	23.0	107.5	444.5	0.0	0.0	0.0	195.1	0.3
3/1827	0.0	0.0	63.5	0.0	9.9	537.9	0.0	0.0	0.2	139.6	0.0
4/1827	22.8	0.0	95.6	0.0	0.1	0.0	0.0	0.0	0.0	115.2	0.0
5/1827	0.2	0.0	216.5	0.0	1.6	348.8	0.0	0.0	19.8	39.7	0.7
6/1827	0.5	0.0	300.3	0.0	0.0	487.2	0.0	0.0	0.0	311.4	0.0
7/1827	0.4	0.0	145.7	0.0	533.4	480.1	0.0	0.0	0.0	77.1	11.5
8/1827	1.0	0.0	533.8	97.0	0.0	903.9	0.0	4.4	0.0	214.5	0.0
9/1827	75.0	0.0	337.6	0.0	73.2	0.0	0.0	0.0	0.0	574.2	0.0
10/1827	1.7	0.0	261.6	0.0	376.5	198.4	0.0	0.0	0.0	369.7	0.0
11/1827	0.0	0.0	126.2	0.0	68.7	0.0	0.0	0.0	0.0	592.7	0.0
12/1827	0.2	10.7	403.4	0.0	0.0	247.7	0.0	0.0	146.2	449.4	0.0
1/1828	0.0	0.0	31.3	0.0	0.0	132.8	0.0	0.0	0.0	268.8	0.0
2/1828	0.0	36.9	243.0	0.0	207.8	427.5	0.0	0.0	0.0	171.8	1.8
3/1828	11.9	0.0	159.3	0.0	335.7	194.9	0.0	0.0	0.0	102.0	0.0
4/1828	8.5	0.0	214.9	0.0	154.1	191.9	0.0	0.0	89.5	0.0	13.2
5/1828	0.7	0.0	618.7	0.0	41.3	146.3	0.0	0.0	0.0	0.0	0.0
6/1828	0.9	0.0	32.7	0.0	113.2	400.1	0.0	0.0	12.4	215.7	1.4
7/1828	35.7	0.0	221.5	0.0	66.4	413.5	0.0	0.0	0.0	0.0	0.0

8/1828	7.6	0.0	235.1	0.0	130.2	600.4	0.0	0.0	4.1	749.9	2.3
9/1828	0.1	0.0	294.3	0.0	0.0	916.3	0.0	0.0	0.0	427.7	2.2
10/1828	0.5	0.0	469.5	0.0	0.0	515.2	0.0	0.0	0.0	318.3	3.3
11/1828	34.4	0.0	124.8	0.0	0.0	261.1	0.0	0.0	0.0	770.0	1.7
12/1828	0.5	0.0	25.0	0.0	232.0	433.9	0.0	0.0	15.1	400.5	1.5
1/1829	0.2	0.0	186.6	0.0	173.5	281.8	0.0	0.0	0.0	265.4	0.0
2/1829	0.5	0.0	1056.3	0.0	0.0	132.2	0.0	0.0	2.5	172.6	0.7
3/1829	2.4	0.1	106.1	0.0	306.0	583.6	0.0	0.0	0.0	303.0	1.5
4/1829	0.8	0.0	330.1	0.0	0.2	125.1	0.0	0.0	75.4	270.4	0.0
5/1829	30.9	0.0	829.2	0.0	18.7	581.5	0.0	0.0	0.0	0.0	3.7
6/1829	47.8	0.0	274.0	0.0	0.0	1047.2	0.0	0.0	80.6	150.3	0.3
7/1829	40.7	0.0	387.4	0.0	64.9	22.0	0.0	22.1	4.4	0.0	0.5
8/1829	0.5	0.0	757.9	0.0	119.0	1212.7	0.0	0.0	0.0	315.3	7.4
9/1829	0.3	0.0	681.0	0.0	0.0	338.5	0.0	0.0	0.0	0.0	3.7
10/1829	0.0	0.0	735.8	0.0	0.0	587.5	0.0	0.0	6.3	92.0	0.7
11/1829	2.0	0.0	230.6	0.0	97.3	349.2	0.0	0.0	2.0	131.0	0.4
12/1829	0.9	0.0	163.0	0.0	190.3	795.5	0.0	0.0	11.3	94.3	0.4
1/1830	0.0	0.0	189.3	0.0	0.0	150.6	0.0	0.0	0.0	153.1	5.5
2/1830	0.0	0.0	213.0	0.0	78.1	152.9	0.0	0.0	0.0	122.1	4.0
3/1830	204.4	0.0	242.2	0.0	18.1	385.7	0.0	0.0	0.0	0.0	2.6
4/1830	439.5	0.0	344.1	0.0	0.0	336.0	0.0	0.0	11.7	377.5	0.0
5/1830	304.2	0.0	515.9	0.0	0.0	320.0	0.0	0.0	1.2	0.0	10.4
6/1830	557.3	0.0	298.9	0.0	144.1	447.0	0.0	0.0	59.9	327.5	5.0
7/1830	0.0	0.0	561.2	0.0	193.3	307.7	0.0	0.0	0.0	628.8	10.9
8/1830	56.3	0.0	161.1	0.0	198.3	471.6	0.0	0.0	256.0	702.8	9.2
9/1830	4.5	0.0	1410.8	0.0	199.3	850.6	0.0	0.0	57.0	592.3	5.2
10/1830	0.0	0.0	359.7	0.0	0.0	0.0	0.0	0.0	0.0	978.6	3.2
11/1830	0.0	0.0	420.4	0.0	303.3	187.2	0.0	0.0	36.1	576.9	1.7
12/1830	283.9	0.0	206.2	0.0	265.7	436.2	0.0	0.0	65.9	547.3	4.7
1/1831	7.3	0.0	218.2	0.0	0.0	278.4	0.0	0.0	0.0	0.0	2.5
2/1831	0.0	0.0	0.0	0.0	72.7	510.8	0.0	0.0	0.0	0.0	1.5
3/1831	0.1	0.0	440.7	0.0	11.9	415.2	0.0	0.0	0.0	0.0	1.5
4/1831	24.8	0.0	316.9	0.0	0.0	339.7	0.0	0.0	16.1	380.0	0.0
5/1831	32.2	0.0	891.3	0.0	0.0	606.8	0.0	0.0	3.2	0.0	5.9
6/1831	52.1	0.0	456.3	0.0	106.8	749.0	0.0	0.0	136.2	546.6	2.5
7/1831	0.0	0.0	617.4	0.0	103.2	371.6	0.0	0.0	0.0	756.2	3.9
8/1831	3.7	0.0	655.8	0.0	86.3	551.8	0.0	0.0	82.8	1096.2	4.6
9/1831	0.0	0.0	907.0	0.0	115.8	959.8	0.0	0.0	84.6	1486.2	5.2
10/1831	0.0	0.0	775.0	0.0	137.5	653.5	0.0	0.0	43.1	1233.3	4.6
11/1831	50.1	0.0	381.7	0.0	86.2	274.8	0.0	0.0	22.5	1087.2	1.8
12/1831	20.1	0.0	238.9	0.0	149.3	554.6	0.0	0.0	113.8	693.0	1.8
1/1832	0.0	0.0	0.0	0.0	0.0	342.7	0.0	0.0	34.2	161.2	0.0
2/1832	0.0	0.0	0.0	0.0	374.7	133.2	0.0	0.0	0.0	203.5	0.0

3/1832	0.0	0.0	33.1	0.0	15.6	108.7	0.0	0.0	47.9	42.5	0.1
4/1832	49.6	0.0	124.6	0.0	0.0	779.6	0.0	0.0	16.0	360.5	2.9
5/1832	32.5	0.0	176.8	0.0	0.0	702.4	0.0	0.0	1.6	0.0	2.0
6/1832	0.0	0.0	89.1	0.0	0.0	955.0	0.0	0.0	23.5	132.2	2.2
7/1832	0.1	0.0	0.0	0.0	56.9	299.4	0.0	0.0	7.2	661.1	8.9
8/1832	0.4	0.0	703.2	0.0	0.0	326.2	0.0	0.0	0.0	207.5	5.9
9/1832	0.1	0.0	0.0	0.0	0.0	605.6	0.0	0.0	11.0	595.0	2.0
10/1832	0.0	3.7	214.1	0.0	6.5	0.0	0.0	0.0	18.5	154.7	0.0
11/1832	0.0	0.0	138.1	0.0	0.0	817.9	0.0	0.0	0.0	1080.4	1.6
12/1832	40.4	0.0	94.2	0.0	14.1	0.0	0.0	0.0	113.8	0.0	1.2
1/1833	0.0	0.0	0.0	0.0	220.4	76.4	0.0	0.0	12.2	0.0	0.0
2/1833	0.1	0.0	64.6	0.0	0.0	40.4	0.0	0.0	0.0	304.9	10.9
3/1833	0.0	0.0	167.0	0.0	72.4	183.8	0.0	0.0	5.8	220.4	0.0
4/1833	0.0	0.0	0.0	0.0	25.7	318.6	0.0	0.0	73.5	66.1	20.7
5/1833	0.0	0.0	0.0	0.0	25.8	433.1	0.0	0.0	0.0	21.7	2.3
6/1833	0.0	0.0	122.2	0.0	0.0	80.9	0.0	0.0	0.0	134.5	0.0
7/1833	0.0	0.0	0.0	0.0	19.1	308.9	0.0	0.0	15.3	376.7	1.9
8/1833	0.9	0.0	0.0	0.0	170.1	253.6	0.0	0.0	0.0	728.6	5.3
9/1833	0.0	0.0	0.0	0.0	332.2	654.0	0.0	0.0	21.0	557.0	3.9
10/1833	0.1	0.0	0.0	0.0	242.4	180.5	0.0	0.0	28.7	1075.8	2.4
11/1833	14.7	0.0	0.0	0.0	207.6	705.7	0.0	0.0	0.0	491.0	2.0
12/1833	0.1	0.0	175.9	0.0	0.0	980.8	0.0	0.0	0.0	790.5	4.4
1/1834	0.0	0.0	0.0	0.0	0.0	570.3	0.0	0.0	0.0	0.0	4.4
2/1834	15.6	0.0	52.6	0.0	106.0	1315.0	0.0	0.0	0.0	291.8	0.0
3/1834	16.4	0.0	177.3	0.0	0.0	946.4	0.0	0.0	0.0	271.8	0.0
4/1834	0.0	0.0	0.0	0.0	68.9	664.6	0.0	0.0	9.9	0.0	8.1
5/1834	0.0	0.0	0.0	0.0	0.0	373.2	0.0	0.0	10.1	142.3	24.5
6/1834	67.6	0.0	0.0	0.0	91.4	905.0	0.0	0.0	0.0	0.0	0.1
7/1834	0.0	0.0	471.0	0.0	68.3	530.2	0.0	0.0	31.6	60.2	0.1
8/1834	71.3	0.0	0.0	0.0	37.8	65.5	0.0	0.0	5.1	198.8	0.7
9/1834	0.0	0.0	514.2	0.0	11.0	220.4	0.0	0.0	0.0	134.9	2.5
10/1834	0.2	0.0	147.6	0.0	7.2	184.7	0.0	0.0	0.0	145.1	8.4
11/1834	22.0	22.0	73.5	0.0	319.3	205.0	0.0	0.0	0.0	260.0	2.5
12/1834	0.0	11.3	23.0	0.0	219.9	636.6	0.0	0.0	0.0	22.8	1.2
1/1835	0.0	0.0	139.6	0.0	1.0	0.0	0.0	0.0	2.2	0.0	3.9
2/1835	0.0	0.0	0.0	0.0	16.5	218.8	0.0	0.0	73.5	262.2	3.2
3/1835	0.0	0.0	189.4	0.0	348.6	1579.1	0.0	0.0	1.9	356.2	3.1
4/1835	0.0	0.0	0.0	0.0	2.0	131.8	0.0	0.0	0.0	327.0	1.5
5/1835	0.0	0.0	0.0	0.0	0.0	407.2	0.0	0.0	0.0	350.3	0.8
6/1835	0.0	0.0	0.0	0.0	29.1	0.0	0.0	0.0	0.0	229.9	1.6
7/1835	0.7	0.0	98.0	0.0	128.9	448.3	0.0	0.0	0.0	506.5	3.2
8/1835	0.2	0.0	440.7	0.0	64.3	543.5	0.0	0.0	0.0	765.3	4.4
9/1835	0.2	0.0	238.7	0.0	0.0	853.5	0.0	0.0	9.4	478.4	3.4

10/1835	0.9	0.0	0.0	0.0	463.3	696.7	0.0	0.0	0.0	934.8	0.0
11/1835	120.2	0.0	1270.2	0.0	3.3	421.4	0.0	0.0	10.7	448.4	0.9
12/1835	36.7	0.0	0.0	0.0	0.0	241.8	0.0	0.0	1.6	1880.2	0.7
1/1836	0.1	0.0	38.6	0.0	27.8	746.3	0.0	0.0	0.0	272.2	5.0
2/1836	0.1	0.0	199.0	0.0	175.0	777.8	0.0	0.0	3.7	201.1	0.0
3/1836	50.5	0.0	0.0	0.0	14.5	945.6	0.0	0.0	0.0	380.4	7.9
4/1836	0.0	0.0	64.8	0.0	331.8	389.2	0.0	0.0	7.3	816.4	0.0
5/1836	91.3	0.0	230.2	0.0	625.3	518.1	0.0	0.0	12.5	455.0	5.7
6/1836	0.0	0.0	209.8	0.0	23.5	645.5	0.0	0.0	0.0	601.3	2.4
7/1836	39.8	0.0	0.0	0.0	648.8	290.9	0.0	0.0	23.5	304.8	4.3
8/1836	72.4	0.0	0.0	0.0	48.3	669.4	0.0	0.0	16.1	745.4	4.7
9/1836	0.0	0.0	0.0	0.0	464.0	807.1	0.0	0.0	40.0	515.7	4.9
10/1836	134.3	0.0	0.0	0.0	185.6	241.4	0.0	0.0	3.7	396.6	6.6
11/1836	0.0	0.0	163.4	0.0	66.4	0.0	0.0	0.0	0.0	1235.0	2.5
12/1836	64.6	0.0	868.2	0.0	77.4	1210.4	0.0	0.0	0.0	278.1	1.8
1/1837	14.8	0.0	543.1	0.0	259.7	330.0	0.0	0.0	0.0	415.9	0.0
2/1837	73.5	0.0	81.3	0.0	0.0	638.9	0.0	0.0	0.0	286.5	3.4
3/1837	84.6	0.0	0.0	0.0	115.5	1463.3	0.0	0.0	56.1	221.1	0.0
4/1837	55.1	0.0	380.4	0.0	146.0	809.9	0.0	0.0	11.0	438.8	8.4
5/1837	0.0	0.0	304.5	0.0	291.9	545.1	0.0	0.0	88.6	0.0	3.1
6/1837	30.2	0.0	217.4	0.0	85.8	724.9	0.0	0.0	2.5	0.0	11.3
7/1837	0.4	0.0	124.9	0.0	0.0	712.8	0.0	0.0	0.0	0.0	10.7
8/1837	0.0	0.0	200.5	176.4	124.5	1211.9	0.0	0.0	56.3	0.0	8.7
9/1837	53.0	0.0	0.0	341.5	0.0	643.3	0.0	0.0	0.0	0.0	4.2
10/1837	0.0	0.0	140.7	0.0	71.0	1059.1	0.0	0.0	31.4	0.0	2.2
11/1837	0.0	0.0	355.3	0.0	251.1	980.6	0.0	0.0	0.0	578.9	1.7
12/1837	89.5	0.0	0.0	0.0	445.3	894.0	0.0	0.0	0.0	1490.3	1.8
1/1838	245.0	0.0	601.8	0.0	0.0	628.7	0.0	0.0	0.0	174.8	2.3
2/1838	0.0	0.0	0.0	0.0	79.8	839.9	0.0	0.0	0.0	15.4	1.8
3/1838	85.6	0.0	0.0	0.0	155.1	570.9	0.0	0.0	0.0	0.0	1.0
4/1838	102.8	0.0	216.6	184.1	457.1	1010.2	0.0	0.0	0.0	0.0	4.0
5/1838	0.0	0.0	189.1	0.0	114.4	609.8	0.0	0.0	51.4	217.4	0.0
6/1838	0.0	0.0	0.0	0.0	569.1	1050.5	0.0	0.0	0.0	642.0	0.0
7/1838	233.9	0.0	328.7	0.0	261.4	928.0	0.0	0.0	29.4	276.2	0.3
8/1838	193.1	0.0	279.1	0.0	74.0	613.5	0.0	0.0	41.4	576.9	0.0
9/1838	0.0	0.0	261.3	168.9	392.3	906.3	0.0	0.0	98.5	1642.6	0.0
10/1838	0.0	0.0	213.7	0.0	253.4	1274.2	0.0	0.0	55.1	812.8	0.0
11/1838	290.9	0.0	194.0	0.0	127.6	264.4	0.0	0.0	0.0	555.6	1.8
12/1838	599.4	0.0	0.0	0.0	411.8	995.6	0.0	0.0	0.0	200.4	0.0
1/1839	528.6	0.0	0.0	0.0	0.0	702.5	0.0	0.0	0.0	258.2	0.0
2/1839	0.0	0.0	232.9	0.0	0.0	554.7	0.0	0.0	0.0	649.7	0.0
3/1839	337.9	0.0	242.4	0.0	193.8	586.5	0.0	0.0	10.9	39.9	0.0
4/1839	69.8	0.0	0.0	0.0	61.7	1433.3	0.0	0.0	0.0	261.0	4.9

5/1839	102.8	0.0	0.0	0.0	62.7	615.1	0.0	0.0	3.8	0.0	7.9
6/1839	586.4	0.0	205.7	0.0	206.9	584.0	0.0	0.0	56.6	366.3	17.6
7/1839	0.0	0.0	254.0	0.0	63.7	976.6	0.0	0.0	61.5	1049.4	14.6
8/1839	202.7	0.0	191.7	0.0	120.5	766.2	0.0	0.0	0.0	844.7	4.9
9/1839	309.7	0.0	527.0	0.0	94.1	1179.8	0.0	0.0	0.0	606.2	4.0
10/1839	235.9	0.0	797.7	0.0	238.9	1187.5	0.0	0.0	75.3	769.8	6.9
11/1839	385.0	0.0	161.7	0.0	428.2	585.6	0.0	0.0	7.4	1140.3	0.4
12/1839	256.9	0.0	204.6	0.0	659.4	2055.6	0.0	0.0	106.6	1365.9	1.5
1/1840	285.4	0.0	254.5	0.0	176.9	1422.4	0.0	0.0	0.0	0.0	2.0
2/1840	196.4	0.0	506.8	0.0	78.9	2872.7	0.0	0.0	0.0	1537.5	8.2
3/1840	9.3	8.3	0.0	0.0	184.8	1694.6	0.0	0.0	180.7	213.2	1.5
4/1840	188.5	0.0	267.6	0.0	94.5	2439.7	0.0	0.0	5.0	1068.6	29.5
5/1840	680.2	0.0	317.1	0.0	447.1	902.3	0.0	0.0	0.0	245.0	14.2
6/1840	357.9	0.0	191.3	0.0	521.4	1641.1	0.0	0.0	480.0	694.8	9.5
7/1840	239.3	22.5	694.8	0.0	139.3	920.5	0.0	0.0	0.0	1227.3	15.4
8/1840	124.3	0.0	467.9	0.0	368.0	704.1	0.0	0.0	125.7	1403.2	6.1
9/1840	0.0	0.0	307.9	0.0	27.8	1198.6	209.4	0.0	0.0	1534.5	10.7
10/1840	207.0	0.0	267.0	0.0	414.1	993.4	0.0	0.0	44.9	1598.6	1.9
11/1840	0.0	0.0	235.3	0.0	167.4	362.2	0.0	0.0	82.0	1846.8	10.2
12/1840	86.4	0.0	0.0	0.0	259.6	1678.0	0.0	0.0	371.4	709.4	8.7
	CHI	NET	NOR	POR	SWE	USA	UK	SPA	OTH	TOT	TOT3
1/1826	0.0	0.0	0.0	0.0	0.0	10.2	36.1	0.0	0.0	127.6	
2/1826											
3/1826											
4/1826											
5/1826											
6/1826											
7/1826	0.0	118.0	0.0	33.4	0.0	283.9	155.7	0.0	0.0	1055.5	
8/1826	0.9	0.0	0.0	176.8	0.0	254.0	705.4	0.0	0.0	1888.2	
9/1826	0.0	0.0	0.0	65.5	0.0	263.5	412.8	0.0	0.0	1433.5	1459.1
10/1826	0.0	215.4	0.0	20.0	0.0	148.0	196.5	0.0	0.0	1726.5	1682.7
11/1826	0.0	0.0	0.0	81.4	0.0	196.1	124.9	0.0	0.0	402.4	1187.5
12/1826	0.0	0.0	0.0	47.2	12.2	109.8	507.8	0.0	0.0	1207.6	1112.2
1/1827	0.0	0.0	0.0	51.2	0.0	33.1	339.3	0.0	0.0	1213.8	941.3
2/1827	1.8	0.0	0.0	0.0	0.0	78.5	239.4	0.0	0.0	1336.9	1252.8
3/1827	0.0	0.0	0.0	167.2	57.1	72.6	242.9	0.0	0.0	1290.9	1280.5
4/1827	0.0	0.0	0.0	38.1	1.8	39.4	14.7	0.0	0.0	327.7	985.2
5/1827	0.0	0.0	0.0	120.8	23.7	150.2	871.3	0.0	0.0	1793.5	1137.4
6/1827	0.0	0.0	0.0	134.8	0.0	175.8	500.2	0.0	0.7	1910.9	1344.0
7/1827	0.0	0.0	0.0	235.8	102.8	66.4	106.0	0.0	0.0	1759.2	1821.2
8/1827	0.0	0.0	0.0	0.0	0.0	341.2	575.4	0.0	0.0	2671.1	2113.8
9/1827	0.0	0.0	0.0	40.6	0.0	229.5	1108.6	0.0	0.0	2438.8	2289.7

10/1827	0.0	0.0	0.0	38.3	0.0	749.6	1049.7	0.0	0.0	3045.7	2718.5
11/1827	0.0	0.0	0.0	158.1	0.0	816.9	522.4	0.0	0.0	2284.9	2589.8
12/1827	0.0	0.0	0.0	173.1	0.0	401.8	441.9	0.0	10.7	2285.0	2538.5
1/1828	4.5	0.0	0.0	185.3	285.9	241.6	334.9	0.0	0.0	1485.1	2018.4
2/1828	0.9	0.0	0.0	93.2	94.5	211.5	0.0	0.0	36.9	1526.0	1765.4
3/1828	49.9	0.0	0.0	267.3	211.6	1059.8	85.7	0.0	0.0	2478.1	1829.7
4/1828	0.0	0.0	0.0	0.0	12.5	249.4	55.1	0.0	15.1	1004.3	1669.5
5/1828	0.0	0.0	0.0	434.4	192.1	146.2	535.4	0.0	82.9	2198.0	1893.5
6/1828	0.0	0.0	0.0	17.3	9.9	177.2	25.4	0.0	0.0	1006.1	1402.8
7/1828	0.0	0.0	0.0	0.0	0.0	517.0	756.9	0.0	0.0	2011.1	1738.4
8/1828	0.0	0.0	0.0	97.1	16.5	1369.5	568.9	0.0	0.0	3781.7	2266.3
9/1828	7.5	0.0	0.0	263.8	0.0	273.3	804.2	0.0	2.0	2991.5	2928.1
10/1828	0.0	0.0	0.0	0.0	0.0	385.3	407.6	0.0	0.0	2099.6	2957.6
11/1828	0.0	0.0	0.0	35.8	0.0	332.9	662.6	0.0	0.0	2223.3	2438.1
12/1828	0.0	0.0	0.0	9.7	0.0	279.0	403.9	0.0	33.1	1834.1	2052.4
1/1829	0.0	0.0	0.0	48.5	0.0	343.3	1081.0	0.0	0.0	2380.3	2145.9
2/1829	53.9	0.0	0.0	1.2	129.9	190.2	600.7	0.7	53.6	2395.2	2203.2
3/1829	0.0	0.0	0.0	4.6	74.1	82.8	240.1	0.0	0.1	1704.3	2159.9
4/1829	0.0	0.0	0.0	11.4	13.5	0.0	119.0	0.0	0.0	945.8	1681.8
5/1829	0.0	0.0	0.0	20.4	116.7	367.5	25.3	0.0	0.0	1993.9	1548.0
6/1829	0.0	0.0	0.0	9.8	0.0	163.4	176.8	0.0	45.0	1995.2	1645.0
7/1829	0.0	0.0	0.0	89.0	134.7	684.8	1219.2	0.0	0.0	2669.8	2219.6
8/1829	0.0	0.0	0.0	34.2	0.0	559.1	456.6	0.0	0.0	3462.8	2709.3
9/1829	0.0	220.3	0.0	20.9	0.0	276.5	728.3	158.1	0.0	2427.4	2853.4
10/1829	0.0	0.0	0.0	167.2	0.0	653.1	370.1	92.5	0.0	2705.5	2865.2
11/1829	0.0	0.0	0.0	119.8	105.9	492.8	510.0	0.0	217.7	2258.6	2463.8
12/1829	0.0	0.0	0.0	92.7	188.2	396.0	478.8	275.4	115.9	2802.6	2588.9
1/1830	0.0	0.0	0.0	2.4	202.5	62.3	1357.3	0.0	0.0	2122.9	2394.7
2/1830	0.0	0.0	0.0	4.6	278.5	65.9	1167.7	0.0	0.0	2086.8	2337.4
3/1830	0.0	0.0	0.0	7.8	247.3	84.0	892.5	0.0	0.0	2084.6	2098.1
4/1830	0.0	0.0	0.0	6.2	0.0	87.6	209.0	0.0	0.0	1811.7	1994.4
5/1830	0.0	0.0	0.0	7.3	165.6	81.5	720.8	0.0	0.0	2126.9	2007.7
6/1830	0.0	0.0	0.0	8.3	97.0	70.4	97.3	0.0	0.0	2112.7	2017.1
7/1830	0.0	0.0	0.0	13.1	230.6	131.9	1143.4	0.0	0.0	3221.0	2486.9
8/1830	5.9	0.0	0.0	147.9	0.0	274.8	210.1	0.0	0.0	2494.1	2609.3
9/1830	0.0	0.0	0.0	15.3	0.0	301.3	0.0	2.1	0.0	3438.4	3051.2
10/1830	0.0	0.0	0.0	95.7	0.0	548.7	126.6	0.0	0.0	2112.4	2681.6
11/1830	0.0	0.0	0.0	79.5	0.0	854.9	300.9	0.0	0.0	2761.0	2770.6
12/1830	5.9	0.0	0.0	4.2	0.0	99.7	1391.8	0.0	0.0	3311.5	2728.3
1/1831	0.0	0.0	0.0	6.1	74.6	78.4	377.2	0.0	0.0	1042.7	2371.8
2/1831	0.0	0.0	0.0	0.1	586.1	182.4	202.0	0.0	0.0	1555.6	1970.0
3/1831	0.0	0.0	0.0	53.5	61.7	1397.7	478.1	0.0	0.0	2860.4	1819.6
4/1831	0.0	0.0	0.0	11.8	0.0	108.3	45.2	0.0	0.0	1242.8	1886.2

5/1831	0.0	0.0	0.0	26.0	312.8	189.0	292.8	0.0	0.0	2359.9	2154.4
6/1831	0.0	0.0	0.0	26.1	161.9	144.2	34.9	0.0	0.0	2416.6	2006.4
7/1831	0.0	0.0	0.0	29.7	277.3	194.8	295.7	0.0	0.0	2649.8	2475.4
8/1831	0.0	0.0	0.0	25.4	69.8	227.5	422.4	0.0	0.0	3226.2	2764.2
9/1831	0.0	0.0	0.0	19.2	0.0	263.9	497.5	0.0	0.0	4339.1	3405.1
10/1831	0.0	0.0	0.0	26.4	89.2	394.1	488.3	0.0	0.0	3844.9	3803.4
11/1831	0.0	0.0	0.0	14.6	67.1	217.8	455.8	0.0	0.0	2659.5	3614.5
12/1831	0.0	0.0	0.0	10.0	105.5	155.0	379.0	0.0	0.0	2421.2	2975.2
1/1832	0.0	0.0	0.0	9.3	220.7	1134.1	1229.0	0.0	0.0	3131.2	2737.3
2/1832	0.0	0.0	0.0	19.8	266.0	752.1	849.3	0.0	0.0	2598.7	2717.1
3/1832	0.0	92.4	0.0	149.6	404.6	1264.9	243.6	0.0	0.0	2403.0	2711.0
4/1832	0.0	0.0	0.0	30.8	0.0	553.2	162.8	0.0	58.4	2138.6	2380.1
5/1832	0.0	0.0	0.0	34.2	52.2	487.0	531.4	0.0	256.5	2276.5	2272.7
6/1832	0.0	0.0	0.0	48.4	27.0	52.7	981.1	0.0	0.0	2311.1	2242.0
7/1832	0.0	0.0	0.0	222.3	0.0	549.9	1004.4	0.0	0.0	2810.2	2465.9
8/1832	0.0	250.7	0.0	0.0	72.9	591.9	1136.3	0.0	113.9	3408.8	2843.4
9/1832	0.0	84.2	0.0	146.4	41.4	599.9	846.7	0.0	0.0	2932.4	3050.5
10/1832	0.0	79.3	0.0	3.7	0.0	1050.7	2175.9	0.0	3.7	3710.6	3350.6
11/1832	4.4	0.0	0.0	0.0	0.0	913.4	1303.0	0.0	135.9	4394.6	3679.2
12/1832	0.0	0.0	0.0	26.1	94.2	794.3	1367.9	0.0	146.9	2693.2	3599.5
1/1833	0.0	0.0	0.0	3.4	516.6	883.1	1556.6	0.0	0.0	3268.6	3452.2
2/1833	0.0	0.0	0.0	0.0	172.4	669.1	356.1	0.0	0.0	1618.6	2526.8
3/1833	0.0	0.0	0.0	75.7	226.1	639.6	306.4	0.0	0.0	1897.2	2261.5
4/1833	293.8	0.0	0.0	59.7	0.0	1560.2	432.0	0.0	0.0	2850.3	2122.0
5/1833	0.0	0.0	0.0	3.7	0.0	1542.5	681.2	0.0	16.7	2727.1	2491.5
6/1833	0.0	0.0	0.0	110.1	0.0	1250.2	812.4	0.0	0.0	2510.4	2695.9
7/1833	0.0	0.0	0.0	33.2	0.0	668.1	1541.2	0.0	0.0	2964.4	2733.9
8/1833	0.4	0.0	0.0	118.1	0.0	2609.6	1697.8	0.0	0.0	5584.4	3686.4
9/1833	0.0	3.9	0.0	41.4	0.0	1876.6	728.5	0.0	0.0	4218.5	4255.8
10/1833	0.0	129.3	0.0	5.9	47.0	2488.9	1359.8	0.0	0.0	5560.7	5121.2
11/1833	0.0	0.0	0.0	36.9	0.0	957.2	2409.6	0.0	0.0	4824.8	4868.0
12/1833	0.0	0.0	0.0	22.3	0.0	383.4	1782.8	0.0	0.0	4140.3	4841.9
1/1834	0.0	0.0	0.0	0.0	0.0	800.1	1708.7	0.0	0.0	3083.5	4016.2
2/1834	0.0	152.9	0.0	0.0	157.6	859.1	1672.2	0.0	18.4	4641.4	3955.0
3/1834	0.0	0.0	0.0	103.7	205.0	658.7	525.4	0.0	0.0	2904.7	3543.2
4/1834	0.0	0.0	0.0	23.6	161.6	621.8	2266.2	0.0	0.0	3824.8	3790.3
5/1834	0.0	37.4	0.0	196.8	318.5	284.0	623.7	0.0	0.0	2010.6	2913.3
6/1834	0.0	0.0	0.0	254.3	377.3	0.0	1169.4	0.0	0.0	2865.0	2900.1
7/1834	0.0	135.9	0.0	49.8	0.0	1209.0	936.3	0.0	0.0	3492.5	2789.4
8/1834	0.0	132.2	0.0	24.0	285.4	647.3	1121.8	0.0	0.0	2590.1	2982.5
9/1834	0.0	221.2	0.0	71.4	0.0	1651.8	990.9	0.0	0.0	3818.3	3300.3
10/1834	0.0	0.0	0.0	158.5	126.8	1252.1	620.0	0.0	0.0	2650.4	3019.6
11/1834	0.0	0.0	0.0	392.8	0.0	1185.6	1045.8	0.0	37.8	3566.3	3345.0

12/1834	0.0	61.7	0.0	56.3	0.0	2796.5	266.3	0.0	11.3	4107.0	3441.2
1/1835	2.8	0.0	0.0	0.0	0.0	1097.1	1166.5	0.0	0.0	2413.1	3362.1
2/1835	0.0	52.7	0.0	226.3	135.1	1035.9	1662.8	0.0	0.0	3687.0	3402.4
3/1835	1.5	0.0	0.0	99.6	322.6	632.2	712.1	0.0	0.0	4246.3	3448.8
4/1835	0.0	21.5	0.0	108.2	0.0	583.7	1273.5	0.0	0.0	2449.2	3460.8
5/1835	0.0	0.0	0.0	150.9	13.3	908.4	568.0	0.0	0.0	2398.8	3031.4
6/1835	0.0	0.0	0.0	107.7	0.0	2430.2	689.3	0.0	0.0	3487.8	2778.6
7/1835	0.0	327.1	0.0	14.1	0.0	1923.4	22.0	0.0	0.0	3472.2	3119.6
8/1835	0.0	0.0	0.0	130.4	77.8	1791.4	783.6	0.0	0.0	4601.6	3853.9
9/1835	0.0	215.4	0.0	0.0	65.1	1401.5	922.9	0.0	0.0	4188.3	4087.4
10/1835	0.0	98.9	0.0	304.9	210.7	3107.2	141.3	0.0	0.0	5958.8	4916.2
11/1835	0.0	14.7	0.0	0.0	0.0	1906.8	311.4	0.0	0.0	4508.0	4885.0
12/1835	0.0	0.0	0.0	155.3	0.0	1069.9	1170.0	0.0	0.0	4556.4	5007.7
1/1836	0.0	0.0	0.0	28.4	43.3	2245.9	1511.5	0.0	0.0	4918.9	4661.1
2/1836	0.0	130.1	31.4	190.4	349.4	2130.3	1267.8	0.0	0.0	5456.1	4977.1
3/1836	0.0	0.0	0.0	83.8	329.0	1473.1	737.2	0.0	0.0	4022.2	4799.0
4/1836	0.0	0.0	0.0	78.9	116.0	951.9	709.4	2.4	0.0	3468.1	4315.4
5/1836	0.0	28.8	0.0	168.9	280.6	1773.5	363.6	0.0	143.2	4696.6	4062.3
6/1836	0.0	0.0	0.0	145.6	0.0	1746.0	0.6	0.0	0.0	3374.7	3846.5
7/1836	0.0	0.0	0.0	316.0	0.0	2313.4	299.3	0.0	0.0	4240.8	4104.0
8/1836	0.0	0.0	0.0	150.5	0.0	1019.1	178.8	0.0	0.0	2904.8	3506.7
9/1836	3.8	48.9	0.0	3.8	0.0	2742.0	44.8	0.0	0.0	4674.9	3940.2
10/1836	0.0	132.2	0.0	12.3	0.0	2418.0	365.0	0.0	0.0	3895.8	3825.2
11/1836	0.0	0.0	0.0	254.0	0.0	2073.0	1150.7	0.0	0.0	4945.0	4505.2
12/1836	44.1	0.0	0.0	7.3	0.0	2403.2	488.5	0.0	0.0	5443.6	4761.4
1/1837	0.0	0.0	0.0	51.4	0.0	1132.2	534.2	0.0	0.0	3281.3	4556.6
2/1837	0.0	36.7	0.0	65.7	1307.3	1787.4	541.6	0.0	0.0	4822.3	4515.7
3/1837	0.0	0.0	0.0	146.1	80.3	827.1	2005.0	0.0	0.0	4999.2	4367.6
4/1837	0.0	0.0	0.0	30.7	0.0	1231.0	386.7	0.0	0.0	3498.0	4439.8
5/1837	0.0	0.0	0.0	80.5	0.0	450.8	1227.1	0.0	0.0	2991.6	3829.6
6/1837	3.7	282.8	0.0	170.5	66.1	404.3	827.8	0.0	0.0	2827.2	3105.6
7/1837	0.0	389.3	0.0	199.4	36.2	170.9	1458.6	0.0	0.0	3103.1	2974.0
8/1837	0.0	0.0	0.0	99.9	0.0	289.7	1101.6	0.0	0.0	3269.5	3066.6
9/1837	0.0	0.0	0.0	223.0	0.0	356.6	1291.4	0.0	0.0	2913.0	3095.2
10/1837	0.0	211.5	0.0	234.8	99.5	943.3	1990.6	0.0	0.0	4784.2	3655.5
11/1837	0.0	0.0	0.0	141.2	0.0	349.9	742.9	0.0	57.6	3459.3	3718.8
12/1837	0.0	0.0	0.0	102.7	0.0	1203.1	2094.4	0.0	0.0	6321.0	4854.8
1/1838	0.0	0.0	0.0	110.9	0.0	1568.5	1327.8	0.0	0.0	4659.8	4813.4
2/1838	0.0	0.0	0.0	0.0	489.5	1966.8	1775.1	0.0	0.0	5168.2	5383.0
3/1838	0.0	128.1	0.0	83.9	34.7	1897.9	1866.4	0.0	0.0	4823.6	4883.9
4/1838	0.0	0.0	0.0	92.5	0.0	948.8	1578.8	0.0	0.0	4594.9	4862.2
5/1838	0.0	0.0	0.0	7.7	150.5	607.4	2726.1	0.0	0.0	4673.8	4697.4
6/1838	0.0	0.0	0.0	33.0	0.0	1020.3	395.8	0.0	0.0	3710.7	4326.5

7/1838	0.0	7.3	0.0	234.4	0.0	1336.9	944.3	0.0	0.0	4580.7	4321.7
8/1838	0.0	0.0	0.0	45.8	0.0	1253.5	648.5	0.0	0.0	3725.8	4005.7
9/1838	0.0	0.0	0.0	0.0	0.0	864.9	243.8	54.3	0.0	4633.0	4313.2
10/1838	0.0	0.0	0.0	149.0	205.9	2722.5	420.5	0.0	0.0	6107.0	4821.9
11/1838	0.0	0.0	0.0	60.7	0.0	3082.0	937.6	0.0	0.0	5514.7	5418.2
12/1838	0.0	8.2	0.0	50.8	0.0	2355.6	538.5	0.0	0.0	5160.1	5594.0
1/1839	0.0	0.0	0.0	20.4	139.3	1347.5	0.0	0.0	20.6	3017.2	4564.0
2/1839	0.0	0.0	0.0	382.5	0.0	1831.8	1409.7	0.0	0.0	5061.3	4412.9
3/1839	0.0	0.0	0.0	23.9	212.8	1427.6	1109.9	0.0	0.0	4185.7	4088.0
4/1839	0.0	0.0	0.0	75.0	181.2	1213.0	89.6	9.5	0.0	3399.0	4215.3
5/1839	0.0	0.0	0.0	11.8	136.6	1663.9	34.5	0.0	0.0	2639.4	3408.0
6/1839	0.0	0.0	0.0	151.8	0.0	1830.9	382.2	0.0	0.0	4388.4	3475.6
7/1839	0.0	0.0	0.0	88.9	276.5	2198.3	201.9	0.0	0.0	5185.3	4071.0
8/1839	0.0	0.0	0.0	216.8	0.0	3406.6	555.3	0.0	0.0	6309.5	5294.4
9/1839	0.0	0.0	0.0	0.0	0.0	4355.1	1047.5	0.0	0.0	8123.4	6539.4
10/1839	0.0	0.0	0.0	225.6	27.4	2570.8	1178.4	0.0	0.0	7314.2	7249.1
11/1839	0.0	0.0	0.0	0.6	104.2	1737.8	1570.7	0.0	0.0	6121.8	7186.5
12/1839	0.0	0.0	0.0	159.3	276.5	1282.4	1658.4	0.0	0.0	8027.0	7154.4
1/1840	0.0	0.0	0.0	29.4	0.0	1261.7	2040.4	0.0	904.9	6377.5	6842.1
2/1840	8.2	0.0	0.0	148.8	187.3	2108.7	1203.2	0.0	25.3	8881.9	7762.1
3/1840	1.5	200.5	0.0	154.4	389.9	620.0	1000.5	0.0	157.4	4816.6	6692.0
4/1840	29.5	0.0	0.0	144.3	0.0	2025.8	1401.9	0.0	0.0	7694.7	7131.1
5/1840	0.0	0.0	0.0	230.3	0.0	1537.5	1060.0	0.0	0.0	5433.7	5981.7
6/1840	0.0	0.0	0.0	259.8	0.0	1355.7	812.2	0.0	0.0	6323.7	6484.0
7/1840	0.0	0.0	0.0	77.3	0.0	728.5	659.4	0.0	36.2	4760.5	5506.0
8/1840	0.0	0.0	0.0	189.6	274.4	1776.9	988.8	0.0	0.0	6429.0	5837.8
9/1840	0.0	0.0	0.0	45.2	0.0	2423.9	663.3	0.0	240.9	6662.1	5950.6
10/1840	34.0	0.0	0.0	169.9	0.0	2219.1	825.9	0.0	273.8	7049.6	6713.6
11/1840	0.0	0.0	0.0	0.0	0.0	2639.4	1404.1	0.0	0.0	6747.5	6819.7
12/1840	0.0	0.0	0.0	233.8	0.0	2817.5	499.2	0.0	0.0	6664.0	6820.4
Sugar											
	AFR	AUS	BEL	CHI	DEN	FRA	GER	ITA	NET	POR	SWE
1/1826	0.0	0.0	0.0	0.0	0.0	0.0	169.5	0.0	0.0	0.0	0.0
2/1826											
3/1826											
4/1826											
5/1826											
6/1826											
7/1826	0.0	0.0	0.0	0.0	0.0	73.5	106.5	0.0	0.0	647.6	0.0
8/1826	13.6	85.7	0.0	102.3	0.0	0.0	259.7	0.0	0.0	685.6	0.0
9/1826	3.2	0.0	0.0	0.0	0.0	34.9	26.4	66.1	0.0	401.4	39.8
10/1826	11.9	312.9	0.0	690.1	0.0	17.6	0.0	0.0	0.0	82.3	0.0
11/1826	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	315.5	0.0

12/1826	3.6	182.9	34.2	0.0	0.0	0.0	287.2	0.0	0.0	89.6	42.6
1/1827	1.4	328.3	0.0	0.0	0.0	0.0	132.9	0.0	0.0	394.7	0.0
2/1827	12.6	0.0	6.6	355.6	293.1	40.4	219.9	0.0	0.0	0.0	0.0
3/1827	10.0	0.2	102.8	0.0	0.0	274.6	44.8	101.4	0.0	497.4	253.4
4/1827	31.4	0.2	154.4	57.1	0.0	200.5	124.9	0.0	0.0	36.7	0.0
5/1827	25.2	23.5	32.3	0.0	0.0	179.2	623.7	77.8	0.0	74.7	103.6
6/1827	5.5	0.0	204.9	0.0	0.0	0.0	525.4	0.0	0.0	123.6	0.0
7/1827	3.2	149.9	71.7	0.0	0.0	0.0	43.3	0.0	0.0	384.7	119.5
8/1827	27.3	108.0	30.9	0.0	142.1	0.0	498.4	0.0	334.7	0.0	0.0
9/1827	40.1	96.6	90.5	0.0	0.0	148.2	0.0	0.0	0.0	38.4	0.0
10/1827	15.1	53.2	5.9	7.8	0.0	46.6	0.0	0.0	0.0	24.1	0.0
11/1827	0.0	414.2	47.3	11.9	0.0	80.1	0.0	0.0	0.0	49.9	0.0
12/1827	2.2	112.7	31.9	0.0	0.0	0.0	45.5	66.3	0.0	115.5	0.0
1/1828	8.0	60.2	29.6	0.2	0.0	0.0	555.4	0.0	0.0	236.8	117.5
2/1828	0.0	115.3	180.1	8.2	0.0	0.0	235.1	0.0	0.0	305.2	348.3
3/1828	50.1	16.2	82.9	0.0	0.0	72.5	314.2	0.0	22.0	540.8	120.5
4/1828	11.0	0.0	0.0	0.0	0.0	0.0	7.7	0.0	0.0	0.0	191.1
5/1828	0.8	0.0	257.5	0.0	0.0	16.2	267.5	0.0	0.0	330.5	56.2
6/1828	9.0	430.5	50.3	0.9	0.0	62.0	1046.8	285.6	0.0	37.4	18.9
7/1828	39.5	0.0	0.0	0.0	0.0	0.0	264.0	0.0	0.0	0.0	0.0
8/1828	19.6	24.2	0.0	55.9	0.0	0.0	25.8	16.8	0.0	268.6	71.2
9/1828	2.0	1.7	15.4	70.4	0.0	0.0	531.1	0.0	0.0	222.8	0.0
10/1828	10.5	421.2	0.0	0.0	0.0	0.0	51.4	0.0	0.0	0.0	0.0
11/1828	3.9	138.0	67.7	0.0	0.0	0.0	36.0	0.0	0.0	20.9	0.0
12/1828	6.8	1126.9	144.0	0.0	0.0	22.0	402.1	245.2	0.0	21.2	0.0
1/1829	4.2	0.0	84.5	0.0	0.0	0.0	0.0	0.0	0.0	378.6	0.0
2/1829	4.8	75.7	25.6	0.0	0.0	0.0	212.2	232.0	0.0	50.8	74.2
3/1829	22.0	500.2	146.9	0.0	0.0	33.4	875.3	0.0	0.0	329.8	415.2
4/1829	6.5	1066.6	10.3	0.0	0.0	25.3	399.0	294.1	0.0	183.3	100.9
5/1829	6.1	0.0	25.7	0.0	0.0	0.0	396.0	0.0	0.0	249.2	26.4
6/1829	53.7	104.2	18.4	3.9	0.0	0.0	280.8	264.9	0.0	15.8	0.0
7/1829	5.9	0.0	0.0	0.0	0.0	0.0	249.3	32.8	0.0	335.8	102.8
8/1829	19.2	58.4	0.0	0.0	0.0	0.0	279.6	0.0	0.0	70.0	0.0
9/1829	252.2	0.0	52.4	0.0	0.0	0.0	20.6	0.0	0.0	36.6	0.0
10/1829	0.0	570.1	0.0	0.0	0.0	0.0	120.0	160.1	0.0	375.7	0.0
11/1829	142.2	443.6	67.7	0.0	0.0	22.3	36.1	163.6	0.0	15.8	7.5
12/1829	466.1	766.9	43.6	7.3	0.0	8.1	19.8	151.8	0.0	9.9	4.4
1/1830	4.7	43.8	86.9	0.0	0.0	172.5	173.6	25.4	0.0	34.9	47.5
2/1830	69.8	45.4	61.1	6.3	0.0	0.0	1027.7	150.6	0.0	99.8	238.6
3/1830	35.8	0.0	290.6	4.9	0.0	164.2	681.0	72.9	0.0	84.0	114.6
4/1830	2.8	0.0	23.7	1.1	0.0	0.0	105.1	13.7	0.0	11.5	5.2
5/1830	20.6	136.5	202.9	6.5	0.0	282.1	1020.7	120.1	0.0	86.3	46.9
6/1830	81.6	78.2	61.6	0.6	0.0	175.5	959.5	119.3	0.0	87.7	105.7

7/1830	15.8	0.0	339.6	12.6	0.0	0.0	760.2	27.1	0.0	94.5	109.2
8/1830	18.5	0.0	0.0	3.3	0.0	0.0	280.5	34.5	0.0	199.6	0.0
9/1830	0.0	238.0	0.0	0.0	0.0	0.0	20.6	130.3	0.0	93.1	0.0
10/1830	2.5	531.6	191.7	0.0	0.0	0.0	0.0	0.0	0.0	162.2	0.0
11/1830	10.8	343.7	176.3	0.0	0.0	146.9	390.0	99.9	0.0	147.0	0.0
12/1830	55.5	184.0	158.6	0.0	0.0	0.0	331.3	92.1	0.0	44.7	0.0
1/1831	1.6	0.0	0.0	0.0	0.0	0.0	604.1	0.0	0.0	166.3	147.6
2/1831	6.3	0.0	0.0	0.0	0.0	0.7	56.6	0.0	0.0	60.1	298.3
3/1831	5.6	0.0	0.0	0.0	0.0	0.0	461.3	143.1	0.0	157.2	571.9
4/1831	1.1	0.0	96.8	54.0	0.0	0.0	815.0	174.3	0.0	29.4	116.1
5/1831	1.0	456.4	108.6	36.0	0.0	1.5	1038.1	200.3	0.0	28.8	138.3
6/1831	3.8	244.9	30.9	3.2	0.0	0.9	914.3	186.5	0.0	27.4	291.9
7/1831	0.9	0.0	197.1	76.4	0.0	0.0	838.4	48.9	0.0	34.2	348.8
8/1831	3.1	43.5	0.0	19.1	0.0	1.4	785.0	18.8	0.0	31.6	73.5
9/1831	1.9	0.0	76.9	50.0	0.0	2.1	363.9	192.1	0.0	18.7	425.8
10/1831	0.4	419.8	107.5	14.3	0.0	0.0	817.6	168.5	0.0	30.7	0.0
11/1831	0.9	451.0	137.2	0.0	0.0	0.9	639.2	172.5	0.0	24.7	0.0
12/1831	2.9	641.1	88.5	26.4	0.0	0.0	351.2	160.1	0.0	15.6	0.0
1/1832	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2/1832	0.0	88.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	433.4
3/1832	0.0	582.4	96.9	0.0	0.0	123.7	297.5	106.0	0.0	94.5	407.1
4/1832	3.5	0.0	20.1	1.5	0.0	0.3	76.4	82.5	0.0	480.5	97.3
5/1832	6.6	1103.8	44.0	2.0	0.0	1.4	190.1	185.1	0.0	920.9	214.2
6/1832	0.0	0.0	1.5	0.0	0.0	0.0	485.5	88.1	0.0	68.7	30.8
7/1832	0.6	55.6	0.0	0.0	0.0	0.0	741.5	78.6	0.0	380.6	0.0
8/1832	1.1	431.3	0.7	35.0	0.0	0.0	272.5	15.4	0.0	0.0	69.0
9/1832	1.4	0.0	0.0	0.0	0.0	0.0	304.2	66.8	0.0	213.0	80.3
10/1832	10.4	429.5	0.0	0.0	0.0	106.1	0.0	189.1	35.7	85.7	0.0
11/1832	3.0	558.3	0.0	0.2	0.0	0.0	182.9	0.0	0.0	0.0	0.0
12/1832	9.5	0.0	18.4	0.0	0.0	0.2	0.0	75.8	0.0	254.5	39.8
1/1833	0.0	278.8	0.0	0.0	0.0	0.0	95.5	66.4	0.0	0.0	608.7
2/1833	4.7	257.6	59.5	0.0	0.0	0.0	40.4	0.0	0.0	0.0	135.5
3/1833	0.0	41.1	0.0	0.0	0.0	5.6	38.9	300.9	0.0	69.7	18.4
4/1833	3.1	540.6	0.0	266.7	0.0	0.0	110.2	69.1	0.0	205.1	0.0
5/1833	3.1	280.6	0.0	151.7	0.0	0.0	207.9	194.3	0.0	21.6	0.0
6/1833	0.3	0.0	44.1	0.0	0.0	0.0	0.0	0.0	0.0	90.1	0.0
7/1833	2.6	0.0	0.0	0.0	0.0	0.0	211.5	14.7	0.0	89.2	0.0
8/1833	5.4	0.0	0.0	208.4	0.0	0.0	190.2	0.0	0.0	380.7	0.0
9/1833	4.2	0.0	0.0	0.0	0.0	0.0	0.0	117.0	5.1	155.8	0.0
10/1833	7.0	202.0	0.0	0.0	0.0	0.0	0.0	202.7	318.8	0.0	0.0
11/1833	6.5	7.3	0.0	0.0	0.0	5.1	0.0	0.0	0.0	170.9	0.0
12/1833	3.6	44.1	0.0	3.4	0.0	0.0	15.4	0.0	0.0	3.3	0.0
1/1834	9.7	229.2	0.0	121.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2/1834	36.3	519.6	13.2	0.0	0.0	0.0	392.2	0.0	0.0	0.0	249.2
3/1834	0.0	0.0	0.0	61.0	0.0	0.0	38.2	0.0	0.0	75.3	0.0
4/1834	9.3	0.0	0.0	218.9	0.0	0.2	259.3	130.7	0.0	46.9	33.8
5/1834	6.4	461.3	0.0	0.0	0.0	0.0	158.8	169.5	36.7	139.2	188.0
6/1834	1.6	0.0	0.0	0.0	0.0	0.0	498.7	117.5	0.0	565.6	371.1
7/1834	2.0	22.7	0.0	331.3	0.0	0.0	112.4	606.3	0.0	307.1	0.0
8/1834	5.6	472.3	0.0	0.0	0.0	9.8	11.0	29.4	0.0	68.4	75.7
9/1834	3.6	108.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	228.6	0.0
10/1834	0.8	168.2	182.9	0.0	0.0	111.7	0.0	123.3	0.0	355.4	14.7
11/1834	1.4	0.0	0.0	0.0	0.0	70.1	8.8	0.0	0.0	440.9	185.0
12/1834	3.2	533.2	18.4	0.0	0.0	264.1	0.0	0.0	0.1	21.1	0.0
1/1835	2.2	288.9	0.0	0.0	0.0	201.9	0.0	103.2	0.0	0.0	0.0
2/1835	2.8	95.5	0.0	0.0	0.0	44.7	0.0	69.8	114.6	385.5	138.3
3/1835	1.2	379.7	370.9	0.0	0.0	1.4	152.0	129.7	0.0	205.2	97.0
4/1835	2.2	353.5	0.0	0.0	0.0	0.0	36.7	0.0	101.4	319.1	0.0
5/1835	0.2	225.7	0.0	0.0	0.0	0.0	345.2	0.0	0.0	180.0	198.3
6/1835	5.4	177.3	0.0	0.0	0.0	70.2	0.0	0.0	0.0	249.5	0.0
7/1835	1.3	0.0	368.8	0.0	0.0	0.0	126.4	0.0	78.6	84.8	0.0
8/1835	3.4	372.5	0.0	0.0	0.0	182.9	218.6	0.0	0.0	227.8	165.5
9/1835	1.0	352.3	0.0	0.0	0.0	0.0	0.0	330.3	0.0	0.0	335.0
10/1835	1.9	142.5	0.0	0.0	0.0	0.3	405.8	206.0	224.8	252.7	116.1
11/1835	22.0	1572.5	0.0	0.0	0.0	0.0	221.1	260.9	11.8	0.0	0.0
12/1835	0.1	635.8	0.0	0.0	0.0	0.0	11.0	77.8	0.0	139.5	0.0
1/1836	0.4	450.5	484.6	0.0	0.0	0.0	32.3	0.0	0.0	71.7	121.6
2/1836	3.6	39.1	7.3	0.0	0.0	0.0	149.0	172.1	0.0	30.2	264.8
3/1836	2.3	458.5	0.0	0.0	0.0	0.0	626.7	33.8	0.0	203.1	514.9
4/1836	0.0	129.5	90.3	0.0	0.0	0.0	103.4	282.5	0.0	105.1	140.5
5/1836	8.0	577.7	0.0	0.0	0.0	51.6	434.2	204.3	201.3	294.3	252.7
6/1836	6.9	406.6	0.0	0.0	0.0	79.3	127.8	0.0	0.0	238.3	0.0
7/1836	1.1	0.0	0.0	0.0	0.0	10.3	0.0	0.0	0.0	380.4	0.0
8/1836	6.9	0.0	0.0	0.0	0.0	60.8	103.6	180.3	0.0	403.7	0.0
9/1836	10.4	83.0	0.0	209.9	0.0	0.0	0.0	79.3	110.9	7.6	0.0
10/1836	2.2	692.6	0.0	33.1	0.0	65.8	0.0	84.6	0.0	156.4	0.0
11/1836	6.2	123.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	546.7	0.0
12/1836	10.3	393.0	0.0	132.2	0.0	0.2	364.3	0.0	0.0	60.8	0.0
1/1837	50.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	424.6	0.0
2/1837	6.4	82.2	0.0	0.0	0.0	0.0	74.4	0.0	162.3	201.7	734.5
3/1837	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	239.0	99.9
4/1837	1.0	0.0	0.0	120.6	0.0	81.6	0.0	21.2	0.0	256.9	0.0
5/1837	0.0	0.0	0.0	102.8	0.0	0.0	0.0	137.1	0.0	804.9	0.0
6/1837	44.8	0.0	0.0	109.8	0.0	0.0	0.0	63.9	0.0	665.2	66.0
7/1837	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	231.0	293.8
8/1837	14.3	0.0	0.0	0.0	0.0	0.0	195.4	61.0	0.0	93.7	0.0

9/1837	2.6	0.0	0.0	0.0	51.4	0.0	240.2	85.9	0.0	474.5	0.0
10/1837	3.7	0.0	0.0	0.0	0.0	0.0	483.6	97.7	181.5	701.8	22.0
11/1837	3.3	0.0	0.0	22.0	0.0	0.0	183.1	0.0	0.0	314.1	0.0
12/1837	34.9	478.0	0.0	270.3	0.0	0.0	81.5	0.0	0.0	129.6	0.0
1/1838	15.9	0.0	29.4	0.0	0.0	0.0	0.0	0.0	0.0	135.9	0.0
2/1838	52.3	1883.0	0.0	0.0	0.0	108.7	433.4	0.0	0.0	0.0	246.1
3/1838	2.8	0.0	0.0	0.0	0.0	0.0	187.3	0.0	0.0	208.5	0.0
4/1838	11.5	0.0	0.0	0.0	0.0	0.4	664.0	0.0	0.0	341.7	0.0
5/1838	1.9	420.4	0.0	0.0	0.0	0.0	254.2	0.0	0.0	78.9	220.4
6/1838	20.2	310.2	0.0	0.0	0.0	0.0	278.0	0.0	0.0	52.3	0.0
7/1838	88.8	0.0	0.0	0.0	0.0	4.2	177.0	105.0	382.9	684.8	0.0
8/1838	33.4	0.0	0.0	0.0	0.0	0.0	227.7	122.1	0.0	175.1	0.0
9/1838	7.0	176.3	0.0	0.0	0.0	110.7	73.5	279.6	0.0	10.0	0.0
10/1838	6.4	0.0	0.0	0.0	0.0	17.7	144.7	49.8	0.0	215.0	8.1
11/1838	2.1	521.3	0.0	0.0	0.0	0.0	0.0	94.7	0.0	258.4	0.0
12/1838	155.1	453.6	0.0	0.0	0.0	0.0	63.9	97.3	91.1	82.6	0.0
1/1839	0.0	293.8	0.0	0.0	0.0	0.0	119.7	0.0	0.0	208.0	70.5
2/1839	2.8	0.0	0.0	0.0	0.0	0.0	665.5	0.0	0.0	376.8	0.0
3/1839	0.0	297.1	0.0	0.0	0.0	0.0	0.0	155.0	0.0	170.0	202.9
4/1839	0.0	794.2	0.0	0.0	0.0	0.0	1188.1	0.0	0.0	253.6	86.5
5/1839	0.0	0.0	0.0	0.0	0.0	0.0	290.7	93.1	0.0	145.2	29.4
6/1839	0.0	18.4	0.0	0.0	0.0	0.0	14.0	207.5	0.0	296.8	375.4
7/1839	3.2	0.0	0.0	0.0	0.0	0.0	0.0	9.5	0.0	238.3	117.0
8/1839	4.9	0.0	0.0	0.0	0.0	0.0	210.8	0.0	0.0	289.9	0.0
9/1839	0.0	138.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10/1839	3.8	146.2	0.0	0.0	0.0	0.0	110.2	263.7	0.0	500.8	97.0
11/1839	5.8	190.8	0.0	0.0	0.0	0.0	0.0	104.0	0.0	12.2	29.4
12/1839	30.9	801.7	0.0	0.0	0.0	0.0	36.7	159.0	0.0	332.5	33.8
1/1840	5.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	141.8	0.0
2/1840	82.7	123.6	0.0	0.0	0.0	0.0	201.5	0.0	0.0	209.5	51.4
3/1840	122.8	0.0	0.0	59.5	0.0	0.0	33.8	20.8	0.0	413.6	22.0
4/1840	1.3	110.9	0.0	0.0	0.0	0.0	393.4	158.8	0.0	317.3	0.0
5/1840	265.4	463.7	0.0	23.4	0.0	0.0	0.0	0.0	0.0	188.5	0.0
6/1840	7.3	961.7	38.9	0.0	0.0	2.7	264.6	109.4	0.0	150.5	0.0
7/1840	62.4	0.0	0.0	0.0	0.0	0.0	128.4	0.0	0.0	47.2	0.0
8/1840	32.1	73.5	43.3	0.0	0.0	0.0	0.0	41.2	0.0	280.9	0.0
9/1840	17.5	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	166.3	0.0
10/1840	2.5	129.1	0.0	120.7	0.0	0.3	0.0	19.2	0.0	48.6	0.0
11/1840	0.0	0.0	0.0	0.0	0.0	1.5	0.0	79.8	0.0	0.0	0.0
12/1840	38.8	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	170.1	0.0

	SPA	RIO	USA	UK	OTH	TOT	TOT3
1/1826	0.0	3.9	70.5	327.7	0.0	571.6	
2/1826							
3/1826							
4/1826							
5/1826							
6/1826							
7/1826	0.0	12.8	0.0	11.0	0.0	851.4	
8/1826	0.0	31.8	0.0	206.2	0.0	1384.9	
9/1826	0.0	18.9	44.8	300.7	0.0	936.3	1057.5
10/1826	0.0	47.3	0.0	11.8	0.0	1173.9	1165.0
11/1826	0.0	0.0	76.9	0.9	0.0	393.2	834.4
12/1826	0.0	12.1	0.0	71.2	0.0	723.4	763.5
1/1827	0.0	24.4	0.0	589.1	0.0	1470.9	862.5
2/1827	0.0	19.4	141.6	92.8	0.0	1181.9	1125.4
3/1827	0.0	9.0	122.6	1321.0	0.0	2737.3	1796.7
4/1827	0.0	0.0	338.0	261.5	0.0	1204.7	1707.9
5/1827	0.0	0.8	128.4	323.5	0.0	1592.6	1844.8
6/1827	0.0	0.0	0.0	40.4	202.7	1102.5	1299.9
7/1827	0.0	30.1	0.0	125.2	273.0	1200.6	1298.6
8/1827	0.0	43.3	3.1	164.3	75.6	1427.7	1243.6
9/1827	0.0	8.6	0.0	450.0	0.0	872.3	1166.9
10/1827	0.0	0.0	0.0	522.6	34.9	710.1	1003.4
11/1827	0.0	0.0	0.0	183.7	0.0	787.2	789.9
12/1827	0.0	0.0	0.0	617.0	0.0	991.2	829.5
1/1828	0.0	0.0	0.0	345.6	0.0	1353.4	1043.9
2/1828	0.0	27.8	0.0	0.0	271.4	1491.4	1278.7
3/1828	0.0	0.0	61.9	69.0	0.0	1350.1	1398.3
4/1828	0.0	9.6	10.2	187.8	303.5	720.8	1187.4
5/1828	0.0	0.0	0.0	27.3	570.6	1526.6	1199.2
6/1828	0.0	25.4	0.0	0.0	148.5	2115.3	1454.2
7/1828	0.0	0.6	0.0	29.4	0.0	333.5	1325.1
8/1828	0.0	1.0	0.0	64.8	0.0	548.0	998.9
9/1828	0.0	34.9	0.2	684.4	0.0	1562.9	814.8
10/1828	0.0	34.1	0.0	191.8	0.0	709.1	940.0
11/1828	0.0	16.0	61.6	106.5	0.0	450.7	907.6
12/1828	25.7	33.8	0.0	601.4	69.8	2698.9	1286.2
1/1829	0.0	33.2	0.0	524.3	0.0	1024.7	1391.4
2/1829	59.4	83.9	139.2	225.2	385.1	1568.1	1763.9
3/1829	0.0	82.4	3.9	348.9	277.2	3035.3	1876.0
4/1829	0.0	25.8	0.0	127.2	168.4	2407.4	2336.9
5/1829	0.0	49.5	0.0	220.0	0.0	973.0	2138.6
6/1829	0.0	18.4	0.9	225.9	304.1	1291.1	1557.2

7/1829	0.0	74.0	0.3	272.2	0.2	1073.3	1112.4
8/1829	0.0	70.4	185.9	66.6	0.0	750.1	1038.1
9/1829	0.0	42.2	0.0	0.4	0.0	404.3	742.6
10/1829	74.2	171.9	208.5	315.7	0.0	1996.2	1050.2
11/1829	0.0	155.3	0.0	160.3	0.0	1214.2	1204.9
12/1829	9.7	196.9	174.2	475.0	0.4	2334.1	1848.2
1/1830	0.0	4.0	0.0	228.2	0.6	822.1	1456.8
2/1830	0.0	12.8	0.0	237.5	7.3	1956.8	1704.3
3/1830	0.0	0.0	0.0	386.5	7.8	1842.2	1540.4
4/1830	0.0	0.6	0.0	10.4	0.7	174.9	1324.7
5/1830	0.0	13.8	0.0	200.5	3.5	2140.5	1385.9
6/1830	0.0	10.7	0.0	0.0	5.7	1686.1	1333.8
7/1830	0.0	8.9	0.0	0.0	0.2	1368.2	1731.6
8/1830	0.0	53.9	59.3	0.0	0.0	649.6	1234.6
9/1830	150.9	74.9	0.0	0.0	0.7	708.5	908.8
10/1830	0.0	36.1	78.2	393.9	0.0	1396.2	918.1
11/1830	0.0	31.5	44.1	342.5	0.0	1732.7	1279.2
12/1830	0.0	12.8	0.0	908.0	0.0	1786.9	1638.6
1/1831	0.0	146.2	466.6	390.8	0.0	1923.2	1814.3
2/1831	0.0	48.3	0.0	49.2	0.0	519.5	1409.9
3/1831	0.0	31.1	17.0	588.5	0.0	1975.6	1472.8
4/1831	0.0	59.0	47.9	75.4	0.0	1468.8	1321.3
5/1831	0.0	173.6	51.5	190.2	0.0	2424.2	1956.2
6/1831	0.0	125.7	0.0	0.0	0.0	1829.5	1445.4
7/1831	0.0	121.2	0.0	0.0	0.0	1665.8	1745.0
8/1831	0.0	42.1	0.0	0.0	0.0	1018.0	1253.7
9/1831	0.0	108.2	0.0	0.0	0.0	1239.6	1059.6
10/1831	0.0	142.7	0.0	444.8	0.0	2146.3	986.9
11/1831	0.0	131.6	0.0	303.0	0.0	1861.1	1058.3
12/1831	0.0	166.9	39.6	897.8	0.0	2390.1	1233.7
1/1832	0.0	0.0	0.0	0.0	0.0	1584.7	1362.6
2/1832	0.0	0.0	0.0	257.1	0.0	779.3	1584.7
3/1832	0.0	1.6	0.0	749.7	0.0	2459.4	1607.8
4/1832	0.0	26.4	0.2	19.5	12.6	820.6	1353.1
5/1832	0.0	151.5	0.7	95.8	16.1	2932.2	2070.7
6/1832	0.0	86.8	0.0	156.3	0.0	917.8	1556.9
7/1832	0.0	0.0	0.0	168.5	0.0	1425.4	1758.4
8/1832	0.0	4.4	0.0	585.8	60.2	1475.5	1272.9
9/1832	0.0	37.4	0.0	27.2	0.0	730.4	1210.4
10/1832	0.0	5.3	0.1	95.1	3.8	960.9	1055.6
11/1832	0.0	34.0	0.0	42.6	0.0	821.0	837.4
12/1832	0.0	74.6	0.0	231.6	0.0	704.3	828.7
1/1833	0.0	89.4	0.0	68.3	0.0	1207.2	910.8

2/1833	0.0	73.6	0.0	485.3	0.0	1056.6	989.4
3/1833	0.0	86.9	0.0	318.0	0.0	879.5	1047.8
4/1833	0.0	364.3	0.0	181.8	0.0	1740.9	1225.7
5/1833	0.0	192.0	0.0	0.0	22.1	1073.3	1231.2
6/1833	0.0	126.2	0.0	48.1	0.0	308.7	1040.9
7/1833	0.0	156.1	150.3	668.8	38.8	1332.2	904.7
8/1833	0.0	57.6	75.0	746.7	151.7	1815.7	1152.2
9/1833	0.0	75.9	0.0	154.5	0.0	512.6	1220.2
10/1833	0.0	154.2	0.0	246.6	0.0	1131.2	1153.2
11/1833	0.0	55.9	0.0	280.0	0.0	525.7	723.2
12/1833	0.0	20.1	0.0	103.9	0.0	193.7	616.9
1/1834	0.0	22.6	0.0	0.0	0.0	383.1	367.5
2/1834	0.0	41.7	703.2	174.1	17.5	2147.1	908.0
3/1834	0.0	13.7	0.0	12.5	0.0	200.7	910.3
4/1834	0.0	172.6	68.5	72.9	0.0	1013.0	1120.2
5/1834	88.1	115.1	182.4	731.8	1.4	2278.8	1164.1
6/1834	0.0	23.1	0.0	114.6	0.0	1692.2	1661.3
7/1834	0.0	0.0	0.0	36.7	0.2	1418.7	1796.6
8/1834	0.0	25.7	0.0	0.0	0.0	697.8	1269.6
9/1834	0.0	60.2	0.0	0.0	0.0	400.4	839.0
10/1834	0.0	113.8	0.0	88.1	0.0	1158.9	752.4
11/1834	0.0	27.7	0.0	140.9	1.3	876.2	811.9
12/1834	0.0	46.1	0.0	252.8	6.3	1145.2	1060.1
1/1835	0.0	84.0	168.9	124.0	0.0	973.1	998.2
2/1835	0.0	154.1	108.7	106.5	0.0	1220.4	1112.9
3/1835	0.0	62.9	0.0	138.3	0.0	1538.3	1243.9
4/1835	0.0	5.1	0.0	247.8	0.0	1065.8	1274.8
5/1835	0.0	41.1	40.3	0.0	44.1	1074.9	1226.3
6/1835	0.0	27.9	112.1	304.3	0.0	946.8	1029.2
7/1835	0.0	301.3	0.0	0.0	12.3	973.6	998.4
8/1835	0.0	29.2	0.0	36.7	2.1	1238.6	1053.0
9/1835	0.0	35.8	0.0	237.4	3.7	1295.4	1169.2
10/1835	0.0	46.0	75.7	121.9	0.0	1593.5	1375.9
11/1835	0.0	21.0	0.0	281.4	0.0	2390.6	1759.9
12/1835	0.0	14.3	100.6	845.2	0.0	1824.4	1936.2
1/1836	0.0	8.0	0.0	0.0	0.0	1169.1	1794.7
2/1836	0.0	8.8	173.5	0.0	23.0	871.6	1288.3
3/1836	0.0	70.0	0.0	288.0	0.0	2197.4	1412.7
4/1836	76.5	37.0	177.1	791.8	5.4	1939.1	1669.4
5/1836	0.0	114.1	361.5	153.8	35.8	2689.4	2275.3
6/1836	0.0	15.4	360.2	0.0	4.4	1238.9	1955.8
7/1836	0.0	3.7	169.7	0.1	0.0	565.3	1497.9
8/1836	0.0	8.6	0.0	0.0	0.0	764.0	856.1

9/1836	0.0	37.7	168.6	0.0	0.0	707.3	678.9
10/1836	0.0	27.6	21.3	0.0	0.0	1083.7	851.7
11/1836	0.0	190.0	0.0	0.0	0.0	866.2	885.8
12/1836	0.0	274.5	0.0	741.7	0.0	1976.9	1309.0
1/1837	0.0	107.5	0.0	141.8	0.0	724.1	1189.1
2/1837	0.0	21.4	0.0	0.0	0.0	1282.9	1328.0
3/1837	0.0	2.1	0.0	0.0	0.0	341.9	783.0
4/1837	0.0	170.6	0.0	0.0	0.0	651.9	758.9
5/1837	0.0	186.3	0.0	0.0	0.0	1231.1	741.7
6/1837	0.0	59.5	0.0	268.8	0.0	1278.0	1053.7
7/1837	0.0	184.5	0.0	275.8	0.0	987.2	1165.4
8/1837	0.0	120.7	0.0	0.0	0.0	485.1	916.7
9/1837	0.0	85.5	0.0	690.7	0.0	1630.8	1034.4
10/1837	0.0	202.6	0.0	154.8	4.3	1852.2	1322.7
11/1837	0.0	42.9	0.0	163.1	0.0	728.5	1403.8
12/1837	0.0	65.1	0.0	176.3	0.0	1235.7	1272.1
1/1838	0.0	62.0	0.0	256.3	0.0	499.4	821.2
2/1838	0.0	87.6	0.0	717.9	0.0	3528.8	1754.7
3/1838	0.0	111.4	0.0	286.1	0.0	796.0	1608.1
4/1838	0.0	101.6	0.0	0.0	0.0	1119.3	1814.7
5/1838	0.0	105.2	0.0	125.0	0.0	1206.0	1040.4
6/1838	0.0	21.2	0.0	419.0	0.0	1100.9	1142.1
7/1838	0.0	132.6	0.0	81.9	0.0	1657.2	1321.4
8/1838	0.0	36.9	0.0	0.0	0.0	595.2	1117.8
9/1838	0.0	31.1	0.0	297.5	0.0	985.6	1079.3
10/1838	0.0	21.0	0.0	269.6	0.0	732.2	771.0
11/1838	0.0	47.5	0.0	0.0	0.0	924.0	880.6
12/1838	0.0	167.2	0.0	287.2	0.0	1398.0	1018.0
1/1839	0.0	69.9	0.0	237.3	6.7	1005.9	1109.3
2/1839	0.0	23.5	0.0	49.2	0.0	1117.8	1173.9
3/1839	0.0	3.1	0.0	70.3	0.0	898.4	1007.3
4/1839	2.7	103.6	86.7	66.1	0.0	2581.5	1532.5
5/1839	0.0	87.3	0.0	349.4	0.0	995.0	1491.6
6/1839	0.0	171.3	0.0	32.8	0.0	1116.1	1564.2
7/1839	0.0	39.2	0.0	63.5	0.0	470.7	860.6
8/1839	0.0	87.6	1.2	11.0	0.0	605.5	730.8
9/1839	0.0	20.6	0.0	0.0	0.0	158.5	411.6
10/1839	0.0	27.5	0.0	0.0	0.0	1149.0	637.7
11/1839	0.0	101.8	0.0	373.6	0.0	817.7	708.4
12/1839	0.0	114.7	0.0	301.0	0.0	1810.4	1259.0
1/1840	0.0	93.6	0.0	351.2	31.4	623.7	1083.9
2/1840	0.0	377.6	0.9	108.7	0.0	1155.8	1196.6
3/1840	0.0	84.9	0.0	129.2	0.0	886.7	888.7

4/1840	0.0	169.9	0.0	18.4	0.0	1170.0	1070.9
5/1840	0.0	115.8	0.0	41.2	0.0	1098.1	1051.6
6/1840	0.0	109.6	0.0	52.1	0.0	1696.8	1321.6
7/1840	0.0	157.9	0.0	0.0	61.9	457.8	1084.2
8/1840	0.0	65.4	0.0	0.0	0.6	537.0	897.2
9/1840	0.0	101.9	0.0	8.8	2.9	297.7	430.8
10/1840	0.0	118.1	0.0	269.6	36.8	745.0	526.6
11/1840	0.0	147.9	0.7	0.0	10.8	240.6	427.8
12/1840	0.0	228.8	0.0	161.7	0.0	599.7	528.4

5.2. Shares (%) in total exports of coffee and sugar from Rio de Janeiro, 1827-1840.

	Coffee														
	GER	BEL	ITA	AUS	POR	NET	SPA	UK	DEN	SWE	FRA	USA	RIO	CHI	OTH
1827	31.2	15.4	3.0	15.7	5.5	1.0	0.0	0.0	2.1	1.8	5.6	15.0	0.1	0.0	3.4
1828	24.4	14.5	1.2	13.7	5.6	1.2	0.0	0.0	0.3	3.5	5.1	21.0	0.1	0.3	9.0
1829	27.1	34.8	1.6	7.1	1.8	5.0	1.1	0.0	0.4	3.1	3.1	15.1	0.1	0.2	0.0
1830	24.5	20.5	3.7	17.2	1.3	1.8	0.0	0.0	2.1	4.6	4.9	9.1	0.2	0.0	10.0
1831	22.4	16.9	5.0	13.9	1.7	2.9	0.0	0.0	1.1	4.0	3.2	17.4	0.1	0.0	11.2
1832	20.3	13.3	6.3	10.6	2.1	4.1	0.0	0.0	0.1	3.5	1.4	25.7	0.1	0.0	12.5
1833	17.5	16.4	2.8	11.6	1.3	3.5	0.0	0.0	0.0	2.4	3.3	37.9	0.1	0.7	2.4
1834	19.7	14.8	4.9	3.8	3.5	4.6	0.0	0.0	0.3	4.6	2.4	30.2	0.1	0.0	11.0
1835	14.2	11.1	3.2	14.4	2.9	4.4	0.0	0.0	1.2	1.8	2.3	39.4	0.1	0.0	4.9
1836	14.8	8.2	2.4	12.1	2.8	1.3	0.0	0.0	0.0	2.2	6.4	45.4	0.1	0.1	4.2
1837	25.7	11.8	5.6	7.4	3.4	3.1	0.0	0.0	3.8	3.7	3.9	20.1	0.1	0.0	11.3
1838	18.2	9.1	5.3	8.9	1.5	4.6	0.1	0.0	0.6	1.6	5.1	34.6	0.0	0.0	10.4
1839	19.1	10.4	1.2	11.9	2.2	3.2	0.0	0.3	0.1	2.3	3.5	40.4	0.1	0.0	5.3
1840	21.7	8.8	2.7	15.4	2.2	2.5	0.0	0.1	0.2	1.2	3.7	27.4	0.2	0.1	13.9
	Sugar														
	GER	BEL	ITA	AUS	POR	NET	SPA	UK	DEN	SWE	FRA	USA	RIO	CHI	OTH
1827	20.5	8.4	6.4	8.4	11.4	7.8	0.1	0.0	3.6	3.3	6.3	4.8	0.9	2.8	15.3
1828	30.7	6.8	6.2	15.7	13.4	1.2	0.2	0.0	0.6	6.3	1.2	0.9	1.2	0.9	14.8
1829	22.7	5.3	7.4	16.4	14.0	2.7	1.3	0.0	0.5	5.6	0.4	3.7	4.5	0.0	15.5
1830	38.3	10.7	8.0	9.8	7.1	3.4	1.0	0.0	0.0	5.3	5.8	1.1	1.6	0.2	7.6
1831	29.2	6.4	8.3	15.3	11.6	4.0	0.5	0.0	0.2	7.1	3.7	0.6	2.2	0.2	10.9
1832	20.1	2.0	8.5	20.8	16.0	4.7	0.0	0.0	0.3	8.8	1.5	0.0	2.7	0.2	14.2
1833	10.2	9.8	9.4	14.0	10.2	7.7	0.8	0.0	0.1	6.6	0.1	1.9	12.3	5.4	11.4
1834	12.6	4.6	13.5	18.7	16.8	1.3	0.8	0.0	0.1	8.4	4.0	7.1	4.9	5.5	1.7
1835	11.9	10.0	8.9	28.5	12.7	4.9	0.1	0.0	0.8	6.6	3.1	3.8	5.1	0.0	3.6
1836	15.0	7.9	7.4	20.9	15.7	2.5	0.5	0.0	0.0	8.4	1.8	9.2	5.0	2.3	3.5
1837	13.2	4.2	4.7	4.5	36.6	4.4	0.1	0.0	0.8	9.8	0.9	0.0	10.0	5.0	5.7
1838	21.1	3.6	7.4	25.9	15.4	6.9	0.0	0.0	0.4	3.4	1.7	0.0	6.4	0.0	7.8
1839	22.8	4.5	9.0	21.1	22.2	0.4	0.1	0.0	0.0	8.2	0.3	0.7	6.7	0.0	4.1
1840	13.7	3.1	5.4	19.6	22.5	1.3	0.2	0.0	0.3	0.8	0.2	0.3	18.6	2.1	11.7

Total exports (metric tons) by trading partner, adjusted for British re-exports

	Coffee						
	GER	BEL	ITA	AUS	POR	NET	SPA
1827	6559.6	3236.8	636.4	3308.5	1158.1	214.2	0.1
1828	6088.2	3622.8	295.3	3424.7	1404.0	303.4	0.0
1829	5970.5	7672.5	350.3	1569.0	407.4	1092.0	251.5
1830	7142.7	5979.4	1088.8	5007.0	392.7	511.0	2.1
1831	7297.3	6663.5	714.0	7278.7	249.1	385.5	0.1
1832	6904.7	4536.5	2134.9	3598.7	698.9	1385.6	0.3
1833	7177.7	6751.2	1147.4	4767.2	536.3	1416.6	0.9
1834	7869.9	5910.4	1975.9	1527.7	1415.5	1843.3	0.2
1835	6437.1	5050.2	1432.3	6539.2	1304.2	1991.3	0.1
1836	7586.1	4229.2	1208.1	6202.1	1439.9	651.0	20.5
1837	11851.0	5458.0	2597.8	3431.4	1563.1	1439.1	0.3
1838	10480.3	5198.4	3060.2	5114.1	874.8	2640.4	54.8
1839	11797.0	6439.4	712.7	7351.3	1362.6	1955.4	19.9
1840	17016.9	6874.6	2098.8	12078.8	1704.3	1986.8	21.1
	UK	DEN	SWE	FRA	USA	RIO	CHI
1827	0.6	450.9	380.1	1174.3	3155.1	15.2	2.3
1828	3.6	81.9	883.8	1280.8	5244.3	27.8	63.8
1829	5.3	97.8	675.7	682.2	3321.3	19.0	54.4
1830	4.7	618.7	1336.4	1443.2	2666.1	63.0	12.6
1831	1.0	142.1	1844.6	882.5	3687.6	36.2	0.4
1832	14.5	48.9	1195.5	492.0	8752.4	28.5	5.4
1833	2.1	16.6	978.3	1365.7	15545.4	54.7	294.4
1834	2.9	138.0	1834.0	951.4	12089.1	52.5	1.1
1835	2.5	550.6	833.6	1057.0	17888.3	27.3	5.5
1836	2.8	21.5	1126.9	3259.6	23290.5	45.9	47.9
1837	4.1	1751.7	1723.9	1790.8	9267.2	56.5	3.7
1838	7.8	359.8	922.4	2916.0	19851.8	11.2	0.0
1839	167.3	38.5	1438.1	2130.2	24918.5	62.8	0.2
1840	76.7	159.7	938.5	2936.5	21516.3	117.9	73.4

	Sugar						
	GER	BEL	ITA	AUS	POR	NET	SPA
1827	3131.2	1278.3	980.0	1286.7	1739.8	1196.9	9.6
1828	4566.8	1007.5	924.5	2334.4	1984.2	178.4	25.7
1829	3300.9	774.8	1080.3	2375.2	2028.9	390.6	184.4
1830	6223.4	1742.2	1298.8	1601.2	1150.5	549.8	164.7
1831	8515.1	998.2	1596.7	2256.7	638.6	1156.3	18.4
1832	3133.1	316.7	1332.0	3249.7	2502.9	733.9	0.2
1833	1206.9	1159.6	1112.0	1652.1	1205.6	904.7	88.5
1834	1686.5	614.4	1811.4	2514.5	2251.7	180.0	103.3
1835	1917.3	1609.4	1443.6	4596.2	2047.1	785.4	18.4
1836	2407.8	1261.6	1184.5	3353.9	2527.0	398.0	83.0
1837	1642.4	520.2	584.7	560.2	4544.0	551.8	7.5
1838	3069.3	527.6	1078.1	3764.9	2246.8	997.0	2.3
1839	2899.4	569.9	1142.1	2680.3	2825.6	53.3	9.9
1840	1305.0	291.9	516.8	1862.4	2136.4	125.3	23.7
	UK	DEN	SWE	FRA	USA	RIO	CHI
1827	4.5	547.4	497.1	969.4	733.8	135.7	432.4
1828	0.2	83.2	932.9	172.8	134.0	183.3	135.7
1829	0.1	70.5	814.2	58.7	541.0	651.9	4.1
1830	0.2	7.4	865.8	947.8	182.6	260.2	35.3
1831	0.4	7.8	2476.3	7.6	623.0	1296.6	279.3
1832	3.2	49.6	1374.1	232.1	3.2	422.5	38.9
1833	0.5	13.2	776.5	10.8	226.8	1452.3	630.3
1834	0.3	10.7	1130.2	530.8	954.1	662.3	732.7
1835	0.3	133.7	1071.7	501.3	606.4	823.0	0.0
1836	0.2	0.0	1348.0	294.3	1482.0	795.4	375.2
1837	0.2	99.2	1219.2	111.7	0.1	1248.8	625.6
1838	0.4	56.6	489.1	250.8	0.1	925.2	0.0
1839	0.1	5.4	1045.1	32.6	87.9	850.1	0.0
1840	3.3	30.3	76.1	18.0	29.7	1771.2	203.7

5.3. Prices (c/lb) of coffee in New York, duty-paid, monthly, 1/1817 to 12/1850.

	Java	Venezuela	Brazil	St. Domingo	Cuba
1/1817	27.5				
2/1817	24.5				
3/1817	23.5				
4/1817	24.5				
5/1817	23.5				
6/1817	24.5				
7/1817	24.0				
8/1817	24.3				
9/1817	24.8				
10/1817	27.5				
11/1817	29.0				
12/1817	30.5				
1/1818	30.5				
2/1818	29.5				
3/1818	29.5				
4/1818	29.5				
5/1818	30.5				
6/1818	30.5				
7/1818	33.0				
8/1818	35.8				
9/1818	38.5				
10/1818	37.3				
11/1818	37.0				
12/1818	35.8				
1/1819	35.5				
2/1819	33.5				
3/1819	32.5				
4/1819	34.5				
5/1819	32.5				
6/1819	32.5				
7/1819	27.0				
8/1819	30.5				
9/1819	32.0				
10/1819	31.0				
11/1819	31.0				
12/1819	30.0				
1/1820	30.0				
2/1820	30.0				
3/1820	30.0				
4/1820	30.5				

5/1820	30.5				
6/1820	30.5				
7/1820					
8/1820					
9/1820					
10/1820					
11/1820					
12/1820					
1/1821					
2/1821					
3/1821					
4/1821					
5/1821					
6/1821					
7/1821					
8/1821					
9/1821					
10/1821					
11/1821					
12/1821					
1/1822	33.0				
2/1822	33.0				
3/1822	33.0			31.0	
4/1822	33.3			32.0	
5/1822	33.8			31.5	
6/1822	33.8			31.5	
7/1822	33.8			31.5	
8/1822	33.8			30.0	
9/1822	33.8			30.0	
10/1822	33.8			29.8	
11/1822	33.8			29.8	
12/1822	31.5			29.0	
1/1823	31.0			28.0	
2/1823	30.5			28.3	
3/1823	29.3			28.0	
4/1823	31.3			28.5	
5/1823	31.3			28.3	
6/1823	30.0			28.0	
7/1823	30.0			27.8	
8/1823	30.0			27.3	
9/1823	29.5			27.0	
10/1823	30.0			26.5	
11/1823	29.0			25.5	

12/1823	28.0			25.0	
1/1824	29.0			23.5	
2/1824	26.0			24.5	25.3
3/1824	27.0			24.0	24.8
4/1824	27.0			22.8	24.5
5/1824	27.0			22.5	23.5
6/1824	27.0			21.8	23.0
7/1824	26.0			21.8	22.8
8/1824	26.0			21.8	22.8
9/1824	26.0			21.8	23.0
10/1824	26.0		22.5	21.5	23.0
11/1824	25.0		22.3	20.5	21.8
12/1824	25.0		21.8	20.8	21.5
1/1825	25.0		21.8	20.9	21.5
2/1825	25.0		21.8	20.9	21.5
3/1825	23.5		21.8	21.3	21.6
4/1825	27.0		25.5	25.0	25.0
5/1825	23.0		24.0	25.0	24.0
6/1825	25.0	23.0	22.5	22.0	22.5
7/1825	24.5	22.5	22.0	21.5	22.0
8/1825	24.0	22.0	22.0	21.5	22.0
9/1825	24.3	22.0	22.3	21.5	22.0
10/1825	24.3	22.5	22.3	21.8	22.3
11/1825	24.0	21.5	22.3	21.3	21.5
12/1825	23.5	21.5	22.0	20.8	21.0
1/1826	23.5	21.5	21.8	20.8	21.3
2/1826	22.3	21.0	21.0	20.3	21.0
3/1826	22.5	21.0	21.0	20.3	21.0
4/1826	22.5	21.0	21.0	20.3	21.3
5/1826	22.5	21.0	21.0	20.5	20.8
6/1826	21.5	20.0	19.8	19.5	19.3
7/1826	21.3	20.0	19.8	19.0	19.3
8/1826	21.3	20.0	19.8	19.0	19.3
9/1826	21.3	20.0	19.5	19.3	19.3
10/1826	21.5	20.0	19.8	19.3	19.3
11/1826	21.5	20.0	19.8	19.3	19.3
12/1826	20.5	20.0	19.8	19.3	19.5
1/1827	20.5	20.0	19.8	19.3	19.5
2/1827	21.0	19.5	19.5	19.3	19.5
3/1827	20.3	19.5	19.5	18.8	19.3
4/1827	21.0	19.8	19.5	18.8	19.3
5/1827	21.5	19.5	19.5	18.8	19.3
6/1827	21.8	19.3	19.3	18.5	19.0

7/1827	21.8	19.3	19.3	18.3	19.0
8/1827	21.5	19.4	19.3	18.3	19.0
9/1827	21.5	19.4	19.3	18.3	19.0
10/1827	21.0	19.3	19.3	18.6	19.8
11/1827	21.0	19.3	19.5	18.4	19.3
12/1827	21.0	19.0	19.5	18.3	19.3
1/1828	21.0	19.0	19.5	18.3	19.3
2/1828	21.0	19.0	19.0	18.1	19.0
3/1828	20.8	17.8	18.5	17.3	18.0
4/1828	20.5	17.3	18.3	17.3	17.3
5/1828	17.5	14.3	14.9	14.3	14.3
6/1828	17.5	14.3	15.0	14.8	14.3
7/1828	17.3	14.8	15.0	14.5	14.5
8/1828	16.8	14.8	15.0	14.3	14.5
9/1828	16.8	15.3	14.5	14.3	14.5
10/1828	16.8	15.3	14.5	14.3	14.5
11/1828	16.8	15.3	14.8	13.9	14.5
12/1828	16.8	14.5	14.8	13.9	14.3
1/1829	16.3	14.5	14.5	13.8	14.3
2/1829	16.3	14.5	14.5	13.8	14.0
3/1829	16.3	14.5	14.5	13.8	14.0
4/1829	16.0	14.5	14.5	13.9	14.3
5/1829	17.0	14.5	14.5	13.8	14.3
6/1829	17.0	14.5	14.3	13.8	14.3
7/1829	16.5	14.5	14.3	13.8	14.0
8/1829	16.5	14.5	14.3	13.5	14.0
9/1829	16.5	14.5	14.5	13.4	14.5
10/1829	16.5	14.5	14.5	13.5	14.5
11/1829	16.5	14.5	14.5	13.5	14.5
12/1829	17.0	14.5	14.5	13.4	14.0
1/1830	17.0	14.5	14.3	13.4	14.0
2/1830	17.0	14.3	14.3	13.4	14.0
3/1830	16.3	14.3	14.0	13.4	14.0
4/1830	16.3	14.3	13.9	13.4	14.0
5/1830	15.3	13.3	12.9	12.4	13.0
6/1830	15.3	13.0	12.3	12.0	12.8
7/1830	15.0	13.0	12.0	11.8	12.4
8/1830	15.0	12.5	11.9	11.8	12.3
9/1830	15.0	12.5	11.9	11.8	12.3
10/1830	15.0	12.5	12.3	12.0	12.3
11/1830	15.0	12.8	12.5	12.1	12.8
12/1830	13.8	12.8	12.8	12.8	12.8
1/1831	13.3	11.5	11.0	10.0	11.3

2/1831	12.8	10.5	11.3	10.1	10.5
3/1831	13.0	11.3	11.6	10.6	11.1
4/1831	13.3	11.5	12.3	11.5	11.6
5/1831	12.8	11.8	12.6	11.6	11.9
6/1831	12.8	11.8	12.8	11.6	11.8
7/1831	12.8	11.6	12.5	11.6	11.8
8/1831	12.8	12.0	12.5	12.1	12.5
9/1831	13.0	12.0	12.8	12.8	12.8
10/1831	13.8	13.3	13.6	13.6	13.0
11/1831	13.5	13.3	13.8	13.3	13.0
12/1831	13.5	13.3	13.8	13.3	13.0
1/1832	14.0	13.3	14.0	13.8	13.5
2/1832	13.8	13.5	14.0	13.6	13.5
3/1832	13.8	13.5	14.0	13.5	13.5
4/1832	13.8	13.5	14.0	13.0	13.5
5/1832	13.8	13.3	13.3	12.8	13.0
6/1832	14.0	13.5	13.5	13.0	13.3
7/1832	13.0	12.5	12.3	12.0	12.0
8/1832	13.0	12.5	12.3	12.3	12.3
9/1832	13.8	13.3	13.3	12.8	12.8
10/1832	14.5	13.8	14.0	13.5	13.8
11/1832	14.3	13.5	14.0	13.3	13.3
12/1832	13.3	13.3	13.3	12.8	13.0
1/1833	13.3	12.8	13.0	11.4	12.0
2/1833	13.3	12.8	13.3	11.8	12.3
3/1833	13.3	12.8	13.5	12.3	12.5
4/1833	13.3	12.3	12.8	11.3	11.6
5/1833	13.3	11.8	12.0	11.3	11.0
6/1833	12.5	12.0	12.0	11.5	11.3
7/1833	12.5	12.3	12.4	12.0	12.0
8/1833	13.0	12.3	12.4	12.0	12.0
9/1833	13.8	13.3	13.0	12.5	12.8
10/1833	13.8	13.3	13.3	12.8	12.8
11/1833	13.5	12.5	12.5	12.4	12.0
12/1833	12.8	12.5	12.5	12.0	11.8
1/1834	12.5	12.0	11.5	11.8	11.0
2/1834	12.5	12.0	12.0	11.3	11.0
3/1834	12.5	11.5	11.5	10.8	11.0
4/1834	12.5	11.5	11.5	10.5	10.8
5/1834	12.5	11.5	11.5	10.8	10.8
6/1834	12.5	11.5	11.5	10.5	10.8
7/1834	12.5	11.5	11.5	10.3	10.8
8/1834	12.3	11.5	11.3	10.3	10.8

9/1834	12.0	12.1	11.6	10.3	10.8
10/1834	12.0	12.1	12.0	10.6	11.3
11/1834	12.3	12.1	11.8	10.3	11.3
12/1834	12.3	12.1	11.8	9.8	11.3
1/1835	12.3	12.0	11.9	9.8	11.0
2/1835	12.3	12.0	11.8	9.8	11.3
3/1835	12.5	12.3	12.3	10.8	12.3
4/1835	12.5	12.3	12.5	10.8	11.8
5/1835	13.0	12.8	12.8	11.6	12.0
6/1835	13.0	12.8	12.8	11.5	12.0
7/1835	13.0	12.8	12.8	11.3	12.0
8/1835	13.0	13.0	12.8	11.5	12.0
9/1835	13.0	12.6	12.0	11.5	12.5
10/1835	13.0	12.6	12.0	11.3	12.3
11/1835	13.0	12.6	12.0	11.3	12.3
12/1835	13.0	12.6	12.0	11.0	12.3
1/1836	13.0	12.6	12.0	11.0	12.3
2/1836	13.0	12.6	12.0	10.8	12.3
3/1836	13.0	12.6	12.5	11.0	12.3
4/1836	13.8	12.6	12.5	11.8	12.3
5/1836	13.8	13.0	12.5	12.0	12.3
6/1836	13.3	12.3	12.0	11.8	12.0
7/1836	14.3	12.6	11.9	11.4	12.3
8/1836	14.3	12.8	11.8	11.5	12.5
9/1836	14.0	12.8	11.3	11.5	12.5
10/1836	14.5	12.8	11.5	11.6	12.5
11/1836	14.0	12.3	11.4	11.0	12.3
12/1836	14.0	12.3	11.9	11.1	12.3
1/1837	14.0	12.3	11.4	10.8	12.0
2/1837	14.1	12.5	11.3	10.3	11.8
3/1837	14.1	12.1	11.8	10.5	11.8
4/1837	14.1	11.3	11.4	10.4	11.3
5/1837	13.8	10.9	11.0	9.8	9.9
6/1837	13.8	10.9	11.0	9.3	9.9
7/1837	14.0	10.4	10.3	9.3	9.9
8/1837	13.5	10.5	10.0	9.5	10.0
9/1837	13.5	10.3	10.0	9.5	10.0
10/1837	13.5	10.8	10.1	9.5	10.0
11/1837	13.5	10.8	10.8	9.5	10.0
12/1837	13.5	11.3	10.8	9.1	10.8
1/1838	13.0	11.0	10.8	8.6	10.5
2/1838	13.0	11.8	11.0	8.3	10.5
3/1838	13.3	11.8	10.5	8.3	11.0

4/1838	13.3	10.9	10.4	8.4	11.0
5/1838	12.3	11.3	9.9	8.4	10.0
6/1838	12.3	9.8	9.9	8.4	10.0
7/1838	12.3	9.8	10.0	8.5	10.0
8/1838	12.3	10.8	10.1	8.8	10.0
9/1838	12.3	11.3	11.0	9.0	10.1
10/1838	13.1	11.3	11.9	9.5	10.1
11/1838	13.4	11.3	11.6	9.5	10.1
12/1838	13.1	11.1	11.7	9.5	10.3
1/1839	12.9	11.0	10.8	9.5	10.4
2/1839	12.8	11.3	11.5	9.5	10.4
3/1839	12.8	11.3	11.5	9.5	10.4
4/1839	12.8	11.3	11.4	9.5	11.0
5/1839	12.8	11.3	11.4	9.5	11.0
6/1839	13.8	11.3	11.4	10.0	11.0
7/1839	13.8	12.0	11.5	10.0	11.0
8/1839	12.8	12.0	11.5	10.0	11.0
9/1839	12.8	11.8	11.1	10.0	11.0
10/1839	12.5	11.5	11.1	9.9	11.0
11/1839	12.8	11.5	11.0	9.9	11.0
12/1839	12.8	11.0	10.5	9.4	10.6
1/1840	12.8	10.8	10.0	8.9	10.3
2/1840	13.0	11.0	10.0	8.8	10.3
3/1840	13.0	11.0	10.5	8.9	10.3
4/1840	13.8	11.0	10.1	9.1	10.3
5/1840	13.8	10.9	9.9	9.0	9.5
6/1840	13.5	10.8	9.8	8.9	9.9
7/1840	13.5	10.6	9.9	8.8	9.9
8/1840	12.9	10.5	9.9	8.8	9.9
9/1840	13.4	11.3	10.8	8.9	10.5
10/1840	13.1	11.3	11.1	9.1	10.5
11/1840	13.4	10.9	11.3	9.1	10.5
12/1840	11.9	10.8	10.9	9.3	10.0
1/1841	13.9	10.8	10.9	9.1	10.5
2/1841	12.8	10.9	11.1	9.1	10.8
3/1841	12.8	10.8	11.0	8.6	10.5
4/1841	12.6	10.6	9.9	8.6	10.5
5/1841	12.6	10.8	10.0	8.8	10.5
6/1841	11.8	10.3	9.9	8.8	10.5
7/1841	12.0	10.8	10.3	8.8	10.5
8/1841	11.8	11.3	10.8	9.0	10.5
9/1841	11.6	11.3	10.9	9.4	10.5
10/1841	11.6	10.6	10.5	8.8	10.4

11/1841	11.4	10.6	10.3	8.8	10.3
12/1841	11.5	10.0	9.8	8.6	10.3
1/1842	11.5	9.8	9.4	8.0	10.3
2/1842	11.5	9.5	9.6	7.8	9.6
3/1842	11.3	9.5	8.9	7.6	9.5
4/1842	11.0	9.3	8.5	7.3	8.6
5/1842	11.0	9.5	9.0	7.1	9.3
6/1842	11.4	9.5	9.0	7.1	9.0
7/1842	11.1	9.1	8.6	7.3	8.3
8/1842	11.5	8.9	8.5	6.9	8.4
9/1842	11.0	8.8	8.5	6.8	8.0
10/1842	10.8	8.9	8.3	6.5	8.0
11/1842	11.0	8.5	8.0	6.4	8.0
12/1842	11.3	7.8	7.9	6.0	8.0
1/1843	11.5	7.9	7.8	5.9	8.0
2/1843	11.5	8.0	8.0	5.8	8.0
3/1843	11.8	8.0	7.8	5.8	8.0
4/1843	11.8	8.0	7.5	5.6	7.8
5/1843	11.8	7.9	7.5	5.8	7.0
6/1843	11.6	7.5	7.3	5.6	7.0
7/1843	11.6	7.8	7.8	5.7	7.5
8/1843	11.8	8.0	7.8	5.9	7.5
9/1843	11.5	8.1	7.8	6.1	7.5
10/1843	11.3	7.8	7.5	5.8	7.3
11/1843	10.8	7.5	7.4	5.8	7.5
12/1843	10.9	7.5	7.1	5.5	7.5
1/1844	10.5	7.3	7.2	5.6	7.1
2/1844	10.5	7.4	7.4	5.4	6.8
3/1844	10.3	7.5	7.0	5.4	6.9
4/1844	10.4	7.5	7.1	5.6	7.0
5/1844	10.4	7.4	7.0	5.6	7.0
6/1844	10.5	7.1	7.0	5.1	7.0
7/1844	10.5	7.3	7.0	5.5	7.0
8/1844	10.5	7.3	6.8	5.7	7.0
9/1844	10.0	7.3	6.6	5.8	6.9
10/1844	9.8	7.4	7.0	5.8	6.9
11/1844	9.8	7.3	6.5	5.8	6.5
12/1844	9.8	7.0	6.5	5.8	6.5
1/1845	9.8	7.0	6.5	5.6	6.5
2/1845	9.8	6.9	6.4	5.4	6.5
3/1845	9.8	6.9	6.5	5.4	6.5
4/1845	9.8	7.5	7.6	5.8	
5/1845	9.8	7.4	7.3	5.8	

6/1845	9.5	7.4	7.0	5.8	
7/1845	9.5	7.0	7.0	5.5	
8/1845	9.5	7.3	7.1	5.9	
9/1845	10.3	7.8	6.4	6.8	
10/1845	10.3	7.8	7.5	6.8	
11/1845	10.5	7.8	7.5	6.6	
12/1845	10.5	7.8	7.4	6.5	
1/1846	10.3	7.8	7.6	6.6	
2/1846	10.3	7.8	7.6	6.8	
3/1846	10.5	7.8	8.0	6.5	
4/1846	10.3	8.3	8.1	7.0	
5/1846	10.5	8.0	7.5	6.5	
6/1846	10.1	8.0	7.6	6.5	
7/1846	10.3	8.0	8.0	6.8	
8/1846	10.3	7.8	7.1	6.6	
9/1846	10.0	7.8	7.3	6.3	
10/1846	10.0	7.8	7.0	6.3	
11/1846	9.5	8.0	7.1	6.3	
12/1846	10.0	7.8	7.5	6.3	
1/1847	9.8	7.8	7.5	6.3	
2/1847	9.8	7.6	7.5	6.3	
3/1847	9.8	7.5	8.0	6.8	
4/1847	9.8	7.8	7.6	6.4	
5/1847	9.8	7.6	7.6	6.6	
6/1847	9.8	7.6	7.0	6.6	
7/1847	9.1	7.5	7.4	6.3	
8/1847	9.0	7.6	7.3	6.6	
9/1847	9.0	7.5	7.3	6.8	
10/1847	9.0	7.6	7.0	6.4	
11/1847	9.0	7.6	7.3	6.5	
12/1847	9.0	7.4	7.0	6.3	
1/1848	9.1	7.3	5.8	6.0	
2/1848	9.1	7.3	6.8	5.8	
3/1848	9.1	7.4	7.0	5.9	
4/1848	9.1	7.3	6.9	6.0	
5/1848	9.1	7.0	7.1	5.9	
6/1848	9.1	7.1	7.0	6.6	
7/1848	9.1	6.6	6.6	6.0	
8/1848	8.5	6.0	6.1	5.4	
9/1848	8.5	6.0	6.1	5.6	
10/1848	8.5	5.5	5.5	5.4	
11/1848	8.3	6.5	6.5	5.8	
12/1848	8.0	6.0	6.0	5.6	

1/1849	8.0	6.0	6.1	5.3	
2/1849	8.3	6.0	6.0	5.6	
3/1849	8.8	6.5	6.1	5.6	
4/1849	8.8	6.8	7.0	5.5	
5/1849	8.6	6.8	7.5	5.6	
6/1849	8.6	6.8	7.0	5.9	
7/1849	8.5	6.3	6.8	6.3	
8/1849	9.8	7.0	7.3	6.6	
9/1849	9.9	7.9	7.3	6.9	
10/1849	9.8	8.3	8.3	7.6	
11/1849	10.5		10.0	9.1	
12/1849	10.5		9.5	8.8	
1/1850	11.8		11.8	9.9	
2/1850	13.3	14.0	14.3	12.1	
3/1850	14.3	12.3	13.5	10.8	
4/1850	12.3	9.8	11.0	8.8	
5/1850	11.3	8.6	8.8	8.6	
6/1850	10.8	8.6	8.5	7.6	
7/1850	11.5	9.6	10.3	8.8	
8/1850	11.6	9.7	9.9	8.5	
9/1850	12.5	10.1	10.3	9.3	
10/1850	12.6	12.1	12.1	10.9	
11/1850	12.9	10.9	10.6	10.1	
12/1850	12.9	10.4	10.9	10.6	

5.4. Foreign market potential of Brazilian coffee and sugar in New York, Liverpool, Hamburg, the United States and the United Kingdom, 1/1827-12/1840.

	Coffee				
	Imports				
	NY	LIV	HAM	US	UK
	Metric tons				
1/1827	409	4		21678	21329
2/1827	1040	16			
3/1827	823	219			
4/1827	987	196			
5/1827	1013	256			
6/1827	931	357			
7/1827	851	76			
8/1827	325	360			
9/1827	504	563			
10/1827	638	221			
11/1827	342	177			
12/1827	382	159			
1/1828	1411	3		23816	18162
2/1828	621	82			
3/1828	601	129			
4/1828	849	103			
5/1828	715	405			
6/1828	583	406			
7/1828	906	229			
8/1828	509	258			
9/1828	452	375			
10/1828	517	116			
11/1828	374	153			
12/1828	498	24			
1/1829	1060	6		22110	17318
2/1829	845	4			
3/1829	831	37			
4/1829	752	259			
5/1829	764	452			
6/1829	624	311			
7/1829	295	344			
8/1829	288	379			
9/1829	195	609			
10/1829	511	188			
11/1829	459	14			

12/1829	526	141			
1/1830	625	15		22299	18282
2/1830	707	102			
3/1830	703	16			
4/1830	1143	153			
5/1830	634	369			
6/1830	804	268			
7/1830	705	588			
8/1830	725	270			
9/1830	168	360			
10/1830	598	87			
11/1830	230	149			
12/1830	938	35			
1/1831	197	19	16839	35560	19200
2/1831	1391	64			
3/1831	935	140			
4/1831	1041	258			
5/1831	2164	152			
6/1831	1075	318			
7/1831	995	187			
8/1831	483	630			
9/1831	409	321			
10/1831	793	57			
11/1831	789	263			
12/1831	297	280			
1/1832	2081	47	15844	39792	22314
2/1832	668	171			
3/1832	2216	77			
4/1832	1573	20			
5/1832	1908	324			
6/1832	1775	396			
7/1832	642	47			
8/1832	463	778			
9/1832	650	710			
10/1832	1327	51			
11/1832	1268	214			
12/1832	1044	423			
1/1833	1203	0	13635	44084	15369
2/1833	1163	196			
3/1833	1555	104			
4/1833	2698	583			
5/1833	2137	187			
6/1833	2141	462			

7/1833	2546	232			
8/1833	639	346			
9/1833	1121	109			
10/1833	1298	11			
11/1833	1619	36			
12/1833	2143	16			
1/1834	1254	14	18642	35401	18690
2/1834	1543	48			
3/1834	1869	29			
4/1834	889	189			
5/1834	1171	245			
6/1834	1138	311			
7/1834	633	6			
8/1834	1072	314			
9/1834	1239	520			
10/1834	935	736			
11/1834	1158	2			
12/1834	1511	12			
1/1835	1880	37	13319	44866	12678
2/1835	1425	15			
3/1835	1891	11			
4/1835	1547	284			
5/1835	2043	539			
6/1835	1405	320			
7/1835	1099	98			
8/1835	1657	344			
9/1835	1586	600			
10/1835	1041	28			
11/1835	941	122			
12/1835	2423	63			
1/1836	1405	111	15587	41506	15203
2/1836	1108	31			
3/1836	2415	48			
4/1836	798	222			
5/1836	1687	236			
6/1836	1657	646			
7/1836	1640	214			
8/1836	1264	79			
9/1836	2182	659			
10/1836	731	91			
11/1836	1850	307			
12/1836	1420	94			
1/1837	1066	104	18067	39276	16256

2/1837	2564	157			
3/1837	1317	25			
4/1837	1873	50			
5/1837	1765	414			
6/1837	1993	311			
7/1837	446	263			
8/1837	109	251			
9/1837	306	198			
10/1837	448	223			
11/1837	704	45			
12/1837	1056	20			
1/1838	1405	125	17157	39026	17827
2/1838	385	12			
3/1838	2355	124			
4/1838	2321	25			
5/1838	1852	446			
6/1838	1142	305			
7/1838	1196	300			
8/1838	1121	522			
9/1838	1495	797			
10/1838	1296	131			
11/1838	1162	8			
12/1838	1465	295			
1/1839	1596	20	16114	46143	11552
2/1839	1543	17			
3/1839	1829	128			
4/1839	1635	110			
5/1839	2561	137			
6/1839	1247	956			
7/1839	1177	651			
8/1839	1036	341			
9/1839	1725	411			
10/1839	796	119			
11/1839	1172	7			
12/1839	994	286			
1/1840	2224	528	20787	41871	18914
2/1840	771	0			
3/1840	1418	32			
4/1840	2225	377			
5/1840	1748	1154			
6/1840	1061	44			
7/1840	1223	352			
8/1840	859	15			

9/1840	421	103			
10/1840	814	327			
11/1840	1314	273			
12/1840	731	94			
	Prices				
	NY	LIV	HAM	US	UK
	s/cwt				
1/1827	68.4	56.3		67.00	51.60
2/1827	68.2	57.2			
3/1827	67.1	54.4			
4/1827	67.7	55.2			
5/1827	67.6	54.0			
6/1827	66.6	51.6			
7/1827	66.4	50.8			
8/1827	66.3	51.1			
9/1827	66.3	49.2			
10/1827	66.8	48.2			
11/1827	66.5	47.3			
12/1827	66.1	44.0			
1/1828	66.3	43.8		61.52	43.14
2/1828	65.1	45.1			
3/1828	61.9	45.0			
4/1828	61.0	44.4			
5/1828	60.7	42.8			
6/1828	61.0	42.4			
7/1828	61.1	42.4			
8/1828	60.6	42.4			
9/1828	60.6	42.4			
10/1828	60.6	41.9			
11/1828	60.0	42.5			
12/1828	59.1	42.6			
1/1829	59.9	42.7		59.34	41.58
2/1829	59.7	42.9			
3/1829	59.8	42.9			
4/1829	59.8	42.9			
5/1829	59.8	41.7			
6/1829	59.6	41.5			
7/1829	58.9	41.5			
8/1829	58.8	41.1			
9/1829	59.3	41.1			
10/1829	59.1	40.5			
11/1829	58.8	40.3			
12/1829	58.7	39.8			

1/1830	59.3	39.7		56.99	38.40
2/1830	59.1	37.9			
3/1830	58.4	37.9			
4/1830	58.4	37.9			
5/1830	58.6	37.4			
6/1830	56.9	38.3			
7/1830	55.8	38.3			
8/1830	54.8	38.3			
9/1830	54.8	38.3			
10/1830	55.3	37.2			
11/1830	56.4	39.8			
12/1830	56.1	39.9			
1/1831	47.1	40.2	50.01	52.23	48.88
2/1831	46.7	40.8			
3/1831	49.1	42.1			
4/1831	51.1	43.0			
5/1831	51.6	42.6			
6/1831	51.6	44.3			
7/1831	51.2	44.3			
8/1831	52.6	53.9			
9/1831	54.0	53.9			
10/1831	57.5	60.0			
11/1831	57.2	60.7			
12/1831	57.2	60.7			
1/1832	58.6	65.5	63.87	59.51	65.73
2/1832	58.7	65.3			
3/1832	58.6	65.3			
4/1832	58.1	66.2			
5/1832	56.3	66.6			
6/1832	58.3	65.1			
7/1832	58.0	65.1			
8/1832	58.1	68.6			
9/1832	60.9	68.6			
10/1832	64.2	64.3			
11/1832	63.3	64.1			
12/1832	60.8	64.1			
1/1833	59.1	63.5	62.17	58.70	69.42
2/1833	59.7	64.1			
3/1833	60.5	64.8			
4/1833	57.8	64.7			
5/1833	56.0	65.6			
6/1833	56.0	66.3			
7/1833	57.4	67.8			

8/1833	57.8	73.7			
9/1833	61.2	77.2			
10/1833	61.6	77.2			
11/1833	59.2	76.3			
12/1833	58.1	72.0			
1/1834	57.9	71.4	58.82	56.35	65.45
2/1834	57.9	70.4			
3/1834	56.5	67.6			
4/1834	55.8	67.6			
5/1834	56.0	63.8			
6/1834	55.8	61.4			
7/1834	55.6	62.5			
8/1834	55.0	62.3			
9/1834	55.6	63.0			
10/1834	57.1	64.7			
11/1834	56.8	64.7			
12/1834	56.2	66.0			
1/1835	53.5	66.1	62.69	56.84	69.02
2/1835	53.6	66.1			
3/1835	56.1	66.5			
4/1835	56.1	67.5			
5/1835	58.1	67.6			
6/1835	58.1	69.8			
7/1835	57.9	69.7			
8/1835	58.4	69.9			
9/1835	58.0	71.0			
10/1835	57.6	71.7			
11/1835	57.6	71.6			
12/1835	57.2	70.8			
1/1836	57.6	70.8	60.81	58.30	69.39
2/1836	57.4	70.1			
3/1836	58.0	68.4			
4/1836	59.2	69.5			
5/1836	59.7	69.5			
6/1836	58.1	66.9			
7/1836	58.6	67.3			
8/1836	58.9	67.7			
9/1836	58.3	70.4			
10/1836	59.0	70.6			
11/1836	57.2	70.7			
12/1836	57.7	70.7			
1/1837	53.7	67.4	50.19	49.91	63.76
2/1837	53.4	67.5			

3/1837	53.6	67.5			
4/1837	52.2	66.0			
5/1837	49.2	66.0			
6/1837	48.8	61.5			
7/1837	47.7	62.2			
8/1837	47.5	60.8			
9/1837	47.4	60.2			
10/1837	47.8	61.5			
11/1837	48.1	61.9			
12/1837	49.3	62.8			
1/1838	50.7	62.8	52.50	50.02	63.65
2/1838	51.2	62.7			
3/1838	51.4	64.1			
4/1838	50.7	63.1			
5/1838	48.7	63.4			
6/1838	47.3	63.7			
7/1838	47.5	63.5			
8/1838	48.6	62.1			
9/1838	49.9	63.5			
10/1838	51.7	65.9			
11/1838	51.7	65.1			
12/1838	50.9	63.9			
1/1839	50.2	63.0	55.00	51.74	67.75
2/1839	51.1	65.7			
3/1839	51.1	65.6			
4/1839	51.5	65.5			
5/1839	51.5	65.8			
6/1839	52.6	69.6			
7/1839	53.3	70.2			
8/1839	52.9	69.8			
9/1839	52.4	69.9			
10/1839	51.9	70.3			
11/1839	52.0	69.2			
12/1839	50.3	68.4			
1/1840	49.7	67.5	53.12	50.50	69.39
2/1840	50.0	74.3			
3/1840	51.2	74.0			
4/1840	51.7	73.1			
5/1840	50.3	64.0			
6/1840	50.1	62.9			
7/1840	50.0	67.4			
8/1840	49.4	67.9			
9/1840	51.2	69.8			

10/1840	51.6	69.9			
11/1840	51.5	71.1			
12/1840	49.4	70.8			
	Freight factor				
	NY	LIV	HAM	US	UK
	% of price				
1/1827	9.7	10.8		11.1	12.2
2/1827	9.5	10.7			
3/1827	9.9	11.0			
4/1827	10.2	11.3			
5/1827	10.4	11.5			
6/1827	10.4	11.3			
7/1827	11.3	12.4			
8/1827	10.9	11.9			
9/1827	11.7	12.6			
10/1827	13.3	14.3			
11/1827	13.0	14.0			
12/1827	13.5	14.1			
1/1828	12.7	13.0		11.9	12.5
2/1828	12.2	12.8			
3/1828	12.0	12.8			
4/1828	12.0	12.9			
5/1828	11.5	12.0			
6/1828	11.6	12.1			
7/1828	11.6	12.1			
8/1828	11.6	12.1			
9/1828	11.6	12.1			
10/1828	11.7	12.2			
11/1828	12.0	12.6			
12/1828	12.1	12.9			
1/1829	12.2	12.9		11.9	12.4
2/1829	12.1	12.9			
3/1829	12.1	12.9			
4/1829	11.4	12.0			
5/1829	11.7	12.2			
6/1829	11.7	12.2			
7/1829	11.7	12.2			
8/1829	11.8	12.3			
9/1829	11.8	12.3			
10/1829	12.0	12.4			
11/1829	12.0	12.5			
12/1829	12.2	12.5			
1/1830	12.2	12.6		12.6	13.1

2/1830	12.8	12.9			
3/1830	12.7	12.9			
4/1830	12.7	12.9			
5/1830	12.9	13.0			
6/1830	12.9	13.3			
7/1830	12.7	13.5			
8/1830	12.8	13.5			
9/1830	12.7	13.5			
10/1830	12.9	13.6			
11/1830	12.7	13.5			
12/1830	11.5	12.2			
1/1831	8.7	11.0	12.2	8.7	10.9
2/1831	8.8	11.0			
3/1831	8.9	11.2			
4/1831	8.7	11.0			
5/1831	8.9	11.2			
6/1831	8.9	11.2			
7/1831	8.6	10.9			
8/1831	8.7	11.0			
9/1831	8.7	10.9			
10/1831	8.6	10.9			
11/1831	8.7	11.0			
12/1831	7.9	9.9			
1/1832	7.1	8.9	8.9	6.8	8.9
2/1832	7.0	9.0			
3/1832	7.1	9.0			
4/1832	7.0	8.9			
5/1832	7.0	9.1			
6/1832	6.7	9.0			
7/1832	6.5	8.7			
8/1832	6.5	8.7			
9/1832	5.9	8.4			
10/1832	7.2	8.9			
11/1832	7.2	8.9			
12/1832	7.0	8.9			
1/1833	7.0	8.9	9.0	6.4	8.6
2/1833	7.0	8.9			
3/1833	7.0	8.9			
4/1833	6.8	8.9			
5/1833	6.6	8.8			
6/1833	6.5	8.8			
7/1833	6.5	8.7			
8/1833	6.0	8.4			

9/1833	5.9	8.2			
10/1833	5.9	8.2			
11/1833	5.8	8.3			
12/1833	5.8	8.1			
1/1834	5.9	8.2	9.4	6.4	8.5
2/1834	6.0	8.2			
3/1834	6.1	8.3			
4/1834	6.1	8.3			
5/1834	6.5	8.5			
6/1834	6.7	8.7			
7/1834	6.6	8.6			
8/1834	6.5	8.6			
9/1834	6.5	8.6			
10/1834	6.4	8.5			
11/1834	6.4	8.5			
12/1834	7.0	9.4			
1/1835	7.0	9.3	9.1	6.9	9.2
2/1835	7.0	9.3			
3/1835	6.9	9.2			
4/1835	7.0	9.4			
5/1835	6.9	9.1			
6/1835	6.9	9.2			
7/1835	7.1	9.4			
8/1835	7.0	9.3			
9/1835	7.0	9.4			
10/1835	7.1	9.5			
11/1835	7.0	9.4			
12/1835	6.4	8.5			
1/1836	6.3	8.4	9.9	6.3	8.4
2/1836	6.3	8.4			
3/1836	6.3	8.3			
4/1836	6.4	8.5			
5/1836	6.2	8.3			
6/1836	6.3	8.3			
7/1836	7.0	9.3			
8/1836	6.3	8.3			
9/1836	6.3	8.4			
10/1836	6.3	8.4			
11/1836	6.3	8.3			
12/1836	5.7	7.6			
1/1837	5.7	7.5	10.5	5.6	7.5
2/1837	5.6	7.5			
3/1837	5.6	7.4			

4/1837	5.7	7.6			
5/1837	5.5	7.4			
6/1837	5.6	7.4			
7/1837	5.7	7.6			
8/1837	5.7	7.6			
9/1837	5.7	7.6			
10/1837	5.7	7.6			
11/1837	5.7	7.6			
12/1837	5.1	6.8			
1/1838	7.1	9.7	10.9	7.2	10.0
2/1838	7.1	9.7			
3/1838	7.0	9.6			
4/1838	7.1	9.8			
5/1838	7.5	10.3			
6/1838	7.5	10.5			
7/1838	7.2	10.1			
8/1838	7.4	10.2			
9/1838	7.2	9.9			
10/1838	6.9	9.6			
11/1838	7.2	9.9			
12/1838	7.6	10.3			
1/1839	6.3	8.8	9.1	6.4	9.0
2/1839	6.1	8.6			
3/1839	6.1	8.6			
4/1839	6.1	8.5			
5/1839	6.0	8.4			
6/1839	6.0	8.5			
7/1839	6.4	9.0			
8/1839	6.8	9.6			
9/1839	6.8	9.6			
10/1839	6.8	9.6			
11/1839	6.5	9.2			
12/1839	6.6	9.4			
1/1840	6.3	9.1	9.9	6.1	8.9
2/1840	5.9	8.9			
3/1840	6.0	8.9			
4/1840	5.9	8.8			
5/1840	6.3	9.0			
6/1840	6.6	9.2			
7/1840	6.5	9.1			
8/1840	6.3	9.1			
9/1840	6.0	8.8			
10/1840	5.8	8.5			

11/1840	5.8	8.5			
12/1840	5.7	8.5			

	Insurance factor	Import tariff				
	All	NY	LIV	HAM	US	UK
	% of price					
1/1827	2.8	33.3	248.8		34.0	272.8
2/1827	2.8	33.4	244.7			
3/1827	2.8	34.0	257.5			
4/1827	2.8	33.7	253.6			
5/1827	2.8	33.7	259.4			
6/1827	2.8	34.2	271.4			
7/1827	2.8	34.3	275.6			
8/1827	2.8	34.4	274.1			
9/1827	2.8	34.4	284.4			
10/1827	2.8	34.1	290.7			
11/1827	2.8	34.3	295.8			
12/1827	2.8	34.5	318.2			
1/1828	2.5	34.4	319.4		22.0	324.8
2/1828	2.5	35.0	310.5			
3/1828	2.5	36.8	311.1			
4/1828	2.5	37.4	315.0			
5/1828	2.5	15.0	327.5			
6/1828	2.5	15.0	330.3			
7/1828	2.5	14.9	330.3			
8/1828	2.5	15.1	330.3			
9/1828	2.5	15.1	330.5			
10/1828	2.5	15.1	334.0			
11/1828	2.5	15.2	329.2			
12/1828	2.5	15.5	329.0			
1/1829	2.0	15.5	327.7		15.6	337.0
2/1829	2.0	15.5	326.0			
3/1829	2.0	15.5	326.0			
4/1829	2.0	15.5	326.0			
5/1829	2.0	15.5	335.6			
6/1829	2.0	15.6	337.3			
7/1829	2.0	15.7	337.3			
8/1829	2.0	15.8	340.8			
9/1829	2.0	15.6	340.8			
10/1829	2.0	15.7	345.9			
11/1829	2.0	15.8	347.8			

12/1829	2.0	15.8	352.2			
1/1830	1.8	15.9	352.7		10.9	364.8
2/1830	1.8	15.9	369.2			
3/1830	1.8	16.1	369.2			
4/1830	1.8	16.1	369.2			
5/1830	1.8	8.0	374.7			
6/1830	1.8	8.3	365.7			
7/1830	1.8	8.4	365.7			
8/1830	1.8	8.6	365.7			
9/1830	1.8	8.6	365.2			
10/1830	1.8	8.5	376.7			
11/1830	1.8	8.3	352.2			
12/1830	1.8	8.4	351.2			
1/1831	2.3	9.9	348.5	0.5	8.9	293.6
2/1831	2.3	9.9	342.9			
3/1831	2.3	9.4	332.2			
4/1831	2.3	9.1	325.8			
5/1831	2.3	9.0	328.3			
6/1831	2.3	9.0	315.8			
7/1831	2.3	9.1	315.8			
8/1831	2.3	8.8	259.5			
9/1831	2.3	8.6	259.8			
10/1831	2.3	8.1	233.3			
11/1831	2.3	8.1	230.8			
12/1831	2.3	8.1	230.8			
1/1832	2.7	7.9	213.6	0.5	4.0	213.1
2/1832	2.7	7.9	214.4			
3/1832	2.7	7.9	214.4			
4/1832	2.7	8.0	211.6			
5/1832	2.7	8.2	210.3			
6/1832	2.7	7.9	215.0			
7/1832	2.7	0.0	215.0			
8/1832	2.7	0.0	204.1			
9/1832	2.7	0.0	204.1			
10/1832	2.7	0.0	217.9			
11/1832	2.7	0.0	218.3			
12/1832	2.7	0.0	218.3			
1/1833	2.0	0.0	220.5	0.5	0.0	202.8
2/1833	2.0	0.0	218.5			
3/1833	2.0	0.0	216.1			
4/1833	2.0	0.0	216.4			
5/1833	2.0	0.0	213.6			
6/1833	2.0	0.0	211.3			

7/1833	2.0	0.0	206.4			
8/1833	2.0	0.0	189.9			
9/1833	2.0	0.0	181.4			
10/1833	2.0	0.0	181.4			
11/1833	2.0	0.0	183.4			
12/1833	2.0	0.0	194.4			
1/1834	1.7	0.0	196.2	0.5	0.0	214.4
2/1834	1.7	0.0	198.9			
3/1834	1.7	0.0	207.1			
4/1834	1.7	0.0	207.1			
5/1834	1.7	0.0	219.6			
6/1834	1.7	0.0	228.2			
7/1834	1.7	0.0	224.1			
8/1834	1.7	0.0	224.6			
9/1834	1.7	0.0	222.2			
10/1834	1.7	0.0	216.3			
11/1834	1.7	0.0	216.3			
12/1834	1.7	0.0	212.0			
1/1835	1.7	0.0	211.7	0.5	0.0	203.0
2/1835	1.7	0.0	211.7			
3/1835	1.7	0.0	210.5			
4/1835	1.7	0.0	207.4			
5/1835	1.7	0.0	207.2			
6/1835	1.7	0.0	200.7			
7/1835	1.7	0.0	200.9			
8/1835	1.7	0.0	200.4			
9/1835	1.7	0.0	197.2			
10/1835	1.7	0.0	195.2			
11/1835	1.7	0.0	195.5			
12/1835	1.7	0.0	197.8			
1/1836	1.7	0.0	197.8	0.5	0.0	201.8
2/1836	1.7	0.0	199.6			
3/1836	1.7	0.0	204.6			
4/1836	1.7	0.0	201.4			
5/1836	1.7	0.0	201.4			
6/1836	1.7	0.0	209.2			
7/1836	1.7	0.0	208.0			
8/1836	1.7	0.0	206.8			
9/1836	1.7	0.0	198.9			
10/1836	1.7	0.0	198.3			
11/1836	1.7	0.0	198.0			
12/1836	1.7	0.0	198.0			
1/1837	1.7	0.0	207.7	0.5	0.0	220.0

2/1837	1.7	0.0	207.4			
3/1837	1.7	0.0	207.4			
4/1837	1.7	0.0	212.1			
5/1837	1.7	0.0	212.1			
6/1837	1.7	0.0	227.7			
7/1837	1.7	0.0	225.2			
8/1837	1.7	0.0	230.2			
9/1837	1.7	0.0	232.7			
10/1837	1.7	0.0	227.7			
11/1837	1.7	0.0	226.2			
12/1837	1.7	0.0	223.0			
1/1838	1.6	0.0	223.0	0.5	0.0	220.0
2/1838	1.6	0.0	223.3			
3/1838	1.6	0.0	218.6			
4/1838	1.6	0.0	221.8			
5/1838	1.6	0.0	220.9			
6/1838	1.6	0.0	219.8			
7/1838	1.6	0.0	220.4			
8/1838	1.6	0.0	225.3			
9/1838	1.6	0.0	220.4			
10/1838	1.6	0.0	212.6			
11/1838	1.6	0.0	214.9			
12/1838	1.6	0.0	219.1			
1/1839	1.7	0.0	222.1	0.5	0.0	206.9
2/1839	1.7	0.0	213.2			
3/1839	1.7	0.0	213.6			
4/1839	1.7	0.0	213.8			
5/1839	1.7	0.0	212.6			
6/1839	1.7	0.0	201.2			
7/1839	1.7	0.0	199.5			
8/1839	1.7	0.0	200.5			
9/1839	1.7	0.0	200.2			
10/1839	1.7	0.0	199.2			
11/1839	1.7	0.0	202.3			
12/1839	1.7	0.0	204.6			
1/1840	1.7	0.0	207.3	0.5	0.0	209.2
2/1840	1.7	0.0	188.3			
3/1840	1.7	0.0	189.2			
4/1840	1.7	0.0	191.5			
5/1840	1.7	0.0	229.7			
6/1840	1.7	0.0	233.6			
7/1840	1.7	0.0	218.2			
8/1840	1.7	0.0	216.6			

9/1840	1.7	0.0	210.7			
10/1840	1.7	0.0	210.3			
11/1840	1.7	0.0	206.8			
12/1840	1.7	0.0	207.7			

	Market potential				
	NY	LIV	HAM	US	UK
1/1827	15.9	1.1		25.5	7.4
2/1827	18.4	2.2			
3/1827	17.5	4.1			
4/1827	18.0	4.1			
5/1827	18.0	4.2			
6/1827	17.6	4.4			
7/1827	17.1	3.2			
8/1827	14.7	4.3			
9/1827	15.6	4.6			
10/1827	15.9	3.8			
11/1827	14.4	3.7			
12/1827	14.5	3.4			
1/1828	18.0	0.7		32.4	6.6
2/1828	15.9	3.0			
3/1828	15.4	3.3			
4/1828	16.1	3.2			
5/1828	25.8	4.0			
6/1828	24.9	4.0			
7/1828	26.7	3.6			
8/1828	24.3	3.7			
9/1828	23.9	4.0			
10/1828	24.3	3.2			
11/1828	22.8	3.4			
12/1828	23.6	2.1			
1/1829	26.9	1.2		38.7	6.5
2/1829	26.0	0.9			
3/1829	26.0	2.4			
4/1829	26.1	3.8			
5/1829	25.9	4.1			
6/1829	25.1	3.8			
7/1829	22.1	3.9			
8/1829	21.9	3.9			
9/1829	20.4	4.2			
10/1829	24.0	3.4			

11/1829	23.5	1.7			
12/1829	23.9	3.2			
1/1830	24.6	1.7		44.3	6.3
2/1830	24.6	2.9			
3/1830	24.5	1.7			
4/1830	26.3	3.2			
5/1830	31.4	3.7			
6/1830	32.4	3.6			
7/1830	31.7	4.1			
8/1830	31.6	3.6			
9/1830	24.6	3.7			
10/1830	30.6	2.8			
11/1830	26.4	3.2			
12/1830	34.8	2.3			
1/1831	27.9	1.9	69.6	57.9	7.0
2/1831	38.1	2.7			
3/1831	36.6	3.3			
4/1831	38.0	3.8			
5/1831	41.8	3.4			
6/1831	38.1	4.0			
7/1831	37.9	3.6			
8/1831	34.2	4.9			
9/1831	33.7	4.4			
10/1831	38.5	3.3			
11/1831	38.2	4.5			
12/1831	33.9	4.6			
1/1832	47.0	3.3	84.6	83.6	8.5
2/1832	40.1	4.4			
3/1832	47.4	3.7			
4/1832	45.4	2.5			
5/1832	46.0	4.9			
6/1832	46.8	5.1			
7/1832	73.8	3.2			
8/1832	70.1	5.8			
9/1832	78.3	5.7			
10/1832	75.9	3.3			
11/1832	75.8	4.5			
12/1832	74.9	5.1			
1/1833	82.0	0.0	87.3	132.3	8.4
2/1833	81.9	4.4			
3/1833	85.4	3.9			
4/1833	93.5	5.4			
5/1833	92.7	4.4			

6/1833	93.5	5.2			
7/1833	96.3	4.7			
8/1833	84.0	5.3			
9/1833	92.3	4.4			
10/1833	94.0	2.2			
11/1833	97.7	3.3			
12/1833	101.3	2.5			
1/1834	97.4	2.4	89.8	134.4	8.4
2/1834	99.3	3.4			
3/1834	99.9	2.9			
4/1834	90.4	4.5			
5/1834	89.9	4.6			
6/1834	87.1	4.7			
7/1834	81.0	1.5			
8/1834	87.9	4.8			
9/1834	90.0	5.2			
10/1834	87.3	5.6			
11/1834	90.3	0.7			
12/1834	87.4	2.1			
1/1835	90.6	3.1	88.9	129.4	8.3
2/1835	87.3	2.3			
3/1835	91.5	2.1			
4/1835	88.0	4.9			
5/1835	93.0	5.4			
6/1835	87.9	5.1			
7/1835	83.4	4.0			
8/1835	88.9	5.1			
9/1835	88.0	5.7			
10/1835	82.5	3.0			
11/1835	82.0	4.3			
12/1835	100.7	3.7			
1/1836	93.6	4.2	84.2	137.9	8.5
2/1836	90.6	3.0			
3/1836	101.5	3.4			
4/1836	86.0	4.8			
5/1836	97.4	4.8			
6/1836	96.6	5.6			
7/1836	88.2	4.6			
8/1836	93.1	3.8			
9/1836	99.8	5.8			
10/1836	85.2	4.0			
11/1836	98.0	5.1			
12/1836	101.8	4.0			

1/1837	98.0	4.0	81.8	149.6	8.1
2/1837	110.5	4.4			
3/1837	101.9	2.8			
4/1837	105.7	3.4			
5/1837	106.7	5.2			
6/1837	107.8	4.7			
7/1837	85.1	4.6			
8/1837	65.9	4.5			
9/1837	80.0	4.3			
10/1837	84.9	4.5			
11/1837	92.0	3.1			
12/1837	105.0	2.5			
1/1838	86.7	4.0	80.0	124.8	8.2
2/1838	71.4	2.1			
3/1838	93.8	4.0			
4/1838	92.5	2.7			
5/1838	86.8	5.1			
6/1838	80.9	4.8			
7/1838	84.0	4.8			
8/1838	81.1	5.1			
9/1838	86.6	5.6			
10/1838	87.8	4.1			
11/1838	83.5	1.7			
12/1838	83.3	4.8			
1/1839	96.1	2.5	90.9	139.0	8.1
2/1839	98.0	2.4			
3/1839	100.1	4.1			
4/1839	99.6	4.0			
5/1839	106.7	4.2			
6/1839	96.5	6.0			
7/1839	91.1	5.7			
8/1839	85.4	5.1			
9/1839	91.3	5.3			
10/1839	82.4	4.2			
11/1839	90.6	1.6			
12/1839	87.3	4.9			
1/1840	99.7	5.4	86.6	141.4	8.5
2/1840	90.6	0.0			
3/1840	97.8	3.1			
4/1840	104.3	5.4			
5/1840	96.8	5.8			
6/1840	86.7	3.1			
7/1840	90.4	4.9			

8/1840	87.9	2.3			
9/1840	80.8	4.0			
10/1840	92.8	5.0			
11/1840	98.8	4.9			
12/1840	91.9	3.9			

	Sugar				
	Imports				
	NY	LIV	HAM	US	UK
	Metric tons				
1/1827	2871	705		31801	194610
2/1827	2876	1122			
3/1827	2895	1837			
4/1827	2792	743			
5/1827	5307	3291			
6/1827	2413	5140			
7/1827	2561	2666			
8/1827	1142	2806			
9/1827	871	3913			
10/1827	1584	2182			
11/1827	479	1738			
12/1827	728	2072			
1/1828	3535	703		23445	231026
2/1828	3258	1280			
3/1828	4642	1592			
4/1828	3618	2301			
5/1828	2854	4269			
6/1828	3167	5936			
7/1828	1871	4987			
8/1828	1203	5035			
9/1828	1010	2339			
10/1828	878	3065			
11/1828	983	965			
12/1828	1079	1053			
1/1829	3646	889		26579	229908
2/1829	3208	2097			
3/1829	9159	1704			
4/1829	5193	4350			
5/1829	3147	5303			
6/1829	2878	3350			
7/1829	2112	5761			

8/1829	2002	3278			
9/1829	762	3280			
10/1829	1357	1056			
11/1829	1157	485			
12/1829	580	1478			
1/1830	640	535		35642	245586
2/1830	1331	3088			
3/1830	3475	1793			
4/1830	4534	2307			
5/1830	4975	3982			
6/1830	5316	2078			
7/1830	3002	6251			
8/1830	4324	4334			
9/1830	2869	3392			
10/1830	4185	1729			
11/1830	3147	1616			
12/1830	4296	1083			
1/1831	1971	1017	41634	44714	266997
2/1831	4714	3679			
3/1831	5466	1399			
4/1831	4595	2767			
5/1831	8425	5025			
6/1831	3981	7600			
7/1831	6020	4053			
8/1831	2720	2922			
9/1831	1471	4490			
10/1831	1602	1102			
11/1831	1166	374			
12/1831	2161	2094			
1/1832	1728	1283	38627	27269	241917
2/1832	1112	2527			
3/1832	3928	709			
4/1832	5266	2823			
5/1832	7513	1250			
6/1832	3926	6312			
7/1832	2714	2352			
8/1832	1131	5818			
9/1832	834	3851			
10/1832	831	1124			
11/1832	898	2575			
12/1832	442	2197			
1/1833	1779	1330	31268	38868	236144
2/1833	1911	1940			

3/1833	3379	3067			
4/1833	5347	3436			
5/1833	8752	5615			
6/1833	3428	6009			
7/1833	4480	2915			
8/1833	2955	5153			
9/1833	3213	1243			
10/1833	4775	915			
11/1833	1128	1506			
12/1833	372	2072			
1/1834	963	1680	24671	48754	236674
2/1834	2641	3659			
3/1834	5258	1353			
4/1834	5080	1934			
5/1834	5610	4192			
6/1834	6318	4676			
7/1834	3757	2436			
8/1834	3252	3029			
9/1834	3261	5239			
10/1834	1518	2865			
11/1834	1370	385			
12/1834	2079	3801			
1/1835	3748	2128	24232	50715	222142
2/1835	2579	2389			
3/1835	6485	3262			
4/1835	12195	2507			
5/1835	6489	8307			
6/1835	5607	5299			
7/1835	3707	3703			
8/1835	4255	3170			
9/1835	2901	5633			
10/1835	1986	1715			
11/1835	2019	1322			
12/1835	1779	2796			
1/1836	792	2033	28604	82211	230317
2/1836	1460	2481			
3/1836	5838	4474			
4/1836	9379	3649			
5/1836	9748	2628			
6/1836	7320	7153			
7/1836	6737	5973			
8/1836	4395	2381			
9/1836	5651	5800			

10/1836	2609	2144			
11/1836	3167	2548			
12/1836	3119	2003			
1/1837	1328	2359	30754	54620	222210
2/1837	1919	3111			
3/1837	5099	2525			
4/1837	8335	4861			
5/1837	8426	3660			
6/1837	4618	8404			
7/1837	2343	2708			
8/1837	3190	4059			
9/1837	2799	1501			
10/1837	1849	2383			
11/1837	2707	1971			
12/1837	2155	2774			
1/1838	1267	3062	35854	63140	249860
2/1838	1307	2096			
3/1838	6614	3782			
4/1838	9630	3954			
5/1838	7188	2420			
6/1838	4946	7061			
7/1838	4644	3940			
8/1838	6082	5943			
9/1838	4223	3813			
10/1838	2648	2320			
11/1838	2764	510			
12/1838	2244	2525			
1/1839	1712	2276	30434	82799	231062
2/1839	4030	1889			
3/1839	8876	4153			
4/1839	8250	1890			
5/1839	8199	2733			
6/1839	7660	7088			
7/1839	5791	3643			
8/1839	5792	3244			
9/1839	3389	3085			
10/1839	2347	1935			
11/1839	713	2190			
12/1839	1089	1608			
1/1840	3052	3948	35073	48968	198663
2/1840	3602	1467			
3/1840	5440	968			
4/1840	6168	4313			

5/1840	5609	2991			
6/1840	8266	1081			
7/1840	5274	1319			
8/1840	3048	1060			
9/1840	3074	2009			
10/1840	3531	1847			
11/1840	3502	1110			
12/1840	2856	2565			
	Prices				
	NY	LIV	HAM	US	UK
	s/cwt				
1/1827	36.0	37.3		36.6	40.5
2/1827	35.5	37.9			
3/1827	35.8	39.6			
4/1827	37.1	38.6			
5/1827	36.5	38.6			
6/1827	36.0	39.2			
7/1827	35.5	41.3			
8/1827	36.5	43.8			
9/1827	36.5	42.8			
10/1827	38.7	42.8			
11/1827	37.7	42.4			
12/1827	37.6	41.4			
1/1828	37.7	40.5		37.4	38.7
2/1828	36.7	39.5			
3/1828	37.0	39.4			
4/1828	37.7	38.8			
5/1828	37.2	38.8			
6/1828	36.9	37.1			
7/1828	37.0	36.8			
8/1828	37.5	36.7			
9/1828	38.0	37.3			
10/1828	38.3	39.6			
11/1828	38.0	40.2			
12/1828	37.4	39.8			
1/1829	37.9	39.8		35.6	36.4
2/1829	37.3	39.8			
3/1829	36.5	37.6			
4/1829	36.4	37.2			
5/1829	35.5	36.7			
6/1829	34.8	36.0			
7/1829	34.5	35.8			
8/1829	35.2	35.8			

9/1829	35.3	35.1			
10/1829	35.0	34.6			
11/1829	34.7	34.3			
12/1829	34.5	33.8			
1/1830	34.9	34.0		34.4	33.7
2/1830	34.9	34.0			
3/1830	36.1	34.0			
4/1830	35.9	34.0			
5/1830	35.4	33.5			
6/1830	33.7	32.9			
7/1830	33.8	30.5			
8/1830	33.6	35.4			
9/1830	34.1	35.8			
10/1830	34.1	34.6			
11/1830	33.7	33.4			
12/1830	32.6	32.4			
1/1831	30.0	32.4	22.2	28.0	30.0
2/1831	28.1	32.5			
3/1831	27.2	31.3			
4/1831	29.7	31.3			
5/1831	28.1	31.3			
6/1831	28.0	29.3			
7/1831	27.0	28.7			
8/1831	27.1	28.2			
9/1831	27.6	28.0			
10/1831	28.0	29.2			
11/1831	27.7	28.8			
12/1831	27.7	28.8			
1/1832	27.4	28.8	25.4	30.2	32.1
2/1832	27.6	29.8			
3/1832	29.5	29.7			
4/1832	30.8	34.2			
5/1832	30.7	33.8			
6/1832	30.3	32.3			
7/1832	30.2	32.6			
8/1832	30.3	34.0			
9/1832	31.3	33.0			
10/1832	31.5	32.3			
11/1832	31.6	32.7			
12/1832	31.4	32.8			
1/1833	31.6	32.6	23.2	33.7	33.6
2/1833	30.6	32.3			
3/1833	31.2	32.3			

4/1833	32.0	29.7			
5/1833	32.5	29.9			
6/1833	32.6	31.4			
7/1833	32.7	31.4			
8/1833	33.3	32.9			
9/1833	40.0	39.4			
10/1833	39.8	38.6			
11/1833	34.8	37.8			
12/1833	33.5	35.0			
1/1834	34.4	33.5	27.0	32.9	32.7
2/1834	33.3	33.0			
3/1834	33.9	33.3			
4/1834	32.6	32.2			
5/1834	31.5	32.2			
6/1834	31.5	30.6			
7/1834	31.2	32.1			
8/1834	32.6	32.1			
9/1834	33.2	32.5			
10/1834	33.5	34.1			
11/1834	33.8	33.2			
12/1834	33.8	33.8			
1/1835	32.3	34.1	31.3	35.2	36.0
2/1835	32.2	34.5			
3/1835	33.2	34.2			
4/1835	34.9	32.8			
5/1835	34.5	33.4			
6/1835	34.4	33.9			
7/1835	36.3	34.1			
8/1835	36.8	37.5			
9/1835	36.3	38.8			
10/1835	36.9	38.8			
11/1835	37.4	39.6			
12/1835	37.4	39.9			
1/1836	38.5	39.2	32.4	40.5	42.2
2/1836	39.3	39.3			
3/1836	45.2	38.8			
4/1836	47.1	38.2			
5/1836	45.4	39.2			
6/1836	39.8	39.2			
7/1836	39.8	45.5			
8/1836	40.3	45.5			
9/1836	40.9	46.2			
10/1836	40.0	45.5			

11/1836	36.8	45.2			
12/1836	33.0	45.2			
1/1837	30.7	38.1	23.7	30.4	36.8
2/1837	31.3	37.0			
3/1837	33.8	36.3			
4/1837	31.2	35.5			
5/1837	27.6	35.5			
6/1837	27.2	35.5			
7/1837	27.5	36.1			
8/1837	29.6	35.4			
9/1837	29.5	35.9			
10/1837	29.5	36.9			
11/1837	33.6	38.0			
12/1837	33.8	41.5			
1/1838	32.2	40.9	25.5	32.5	37.3
2/1838	33.9	39.9			
3/1838	32.8	40.4			
4/1838	31.5	37.6			
5/1838	30.6	35.4			
6/1838	29.8	36.0			
7/1838	30.1	36.4			
8/1838	31.6	36.4			
9/1838	33.4	36.4			
10/1838	33.9	34.4			
11/1838	35.0	35.8			
12/1838	35.5	38.2			
1/1839	30.8	38.7	26.5	31.6	40.8
2/1839	31.9	39.3			
3/1839	33.0	40.7			
4/1839	32.2	40.3			
5/1839	32.0	40.3			
6/1839	31.6	42.9			
7/1839	31.6	42.7			
8/1839	31.6	41.6			
9/1839	31.6	42.2			
10/1839	31.9	41.1			
11/1839	31.4	40.0			
12/1839	29.9	40.1			
1/1840	27.2	39.7	24.1	28.5	47.4
2/1840	28.4	41.3			
3/1840	27.1	42.1			
4/1840	26.9	40.3			
5/1840	26.9	43.7			

6/1840	26.8	48.4			
7/1840	27.1	60.0			
8/1840	28.3	59.2			
9/1840	29.9	60.5			
10/1840	30.9	58.2			
11/1840	31.5	38.0			
12/1840	31.4	37.3			
	Freight factor				
	NY	LIV	HAM	US	UK
	% of price				
1/1827	11.4	13.7		12.2	14.0
2/1827	11.5	13.6			
3/1827	11.5	13.2			
4/1827	11.8	14.1			
5/1827	11.9	14.1			
6/1827	11.4	13.3			
7/1827	12.7	14.1			
8/1827	11.9	13.0			
9/1827	12.5	13.8			
10/1827	13.6	15.5			
11/1827	13.3	15.0			
12/1827	12.7	14.7			
1/1828	11.6	13.6		11.1	13.3
2/1828	11.9	13.9			
3/1828	11.8	13.9			
4/1828	11.6	14.0			
5/1828	10.7	12.7			
6/1828	10.7	13.1			
7/1828	10.7	13.1			
8/1828	10.6	13.2			
9/1828	10.5	13.0			
10/1828	10.5	12.6			
11/1828	11.0	13.1			
12/1828	11.4	13.5			
1/1829	11.3	13.5		11.2	13.5
2/1829	11.5	13.5			
3/1829	11.6	14.0			
4/1829	10.8	13.1			
5/1829	11.0	13.2			
6/1829	11.1	13.3			
7/1829	11.2	13.4			
8/1829	11.0	13.4			
9/1829	11.0	13.6			

10/1829	11.1	13.7			
11/1829	11.1	13.8			
12/1829	11.2	13.9			
1/1830	11.1	13.8		11.3	13.9
2/1830	11.1	13.8			
3/1830	10.9	13.8			
4/1830	10.9	13.8			
5/1830	11.0	14.0			
6/1830	11.5	14.1			
7/1830	11.9	14.1			
8/1830	12.0	14.2			
9/1830	11.8	14.1			
10/1830	12.2	14.5			
11/1830	11.7	13.9			
12/1830	10.3	12.3			
1/1831	15.1	18.0	21.3	14.6	17.4
2/1831	14.9	17.7			
3/1831	14.6	17.5			
4/1831	15.0	17.9			
5/1831	14.7	17.6			
6/1831	15.2	18.1			
7/1831	14.3	17.1			
8/1831	14.7	17.6			
9/1831	14.6	17.5			
10/1831	14.3	17.1			
11/1831	14.7	17.6			
12/1831	12.8	15.3			
1/1832	10.8	13.0	14.8	10.5	12.9
2/1832	10.6	12.8			
3/1832	10.7	12.7			
4/1832	10.8	13.0			
5/1832	10.4	13.4			
6/1832	10.7	13.8			
7/1832	10.0	12.6			
8/1832	10.3	13.0			
9/1832	10.1	12.5			
10/1832	10.5	12.7			
11/1832	10.5	12.7			
12/1832	10.6	12.6			
1/1833	10.5	12.7	15.7	10.1	12.4
2/1833	10.7	12.7			
3/1833	10.6	12.7			
4/1833	10.4	13.4			

5/1833	10.3	13.4			
6/1833	10.3	13.0			
7/1833	10.3	13.0			
8/1833	10.2	12.6			
9/1833	9.2	11.3			
10/1833	9.2	11.5			
11/1833	9.9	11.6			
12/1833	9.6	11.4			
1/1834	9.4	11.7	14.5	9.8	12.0
2/1834	9.6	11.8			
3/1834	9.5	11.8			
4/1834	9.7	12.0			
5/1834	9.9	12.0			
6/1834	9.9	12.4			
7/1834	9.9	12.0			
8/1834	9.7	12.0			
9/1834	9.6	11.9			
10/1834	9.6	11.6			
11/1834	9.5	11.8			
12/1834	11.0	13.5			
1/1835	10.7	13.2	13.2	10.9	13.3
2/1835	10.9	13.4			
3/1835	11.1	13.6			
4/1835	10.8	13.2			
5/1835	11.0	13.5			
6/1835	10.7	13.1			
7/1835	11.3	13.9			
8/1835	11.0	13.5			
9/1835	11.1	13.6			
10/1835	11.3	13.9			
11/1835	10.8	13.3			
12/1835	9.6	11.8			
1/1836	9.4	11.5	14.3	9.4	11.4
2/1836	9.5	11.7			
3/1836	9.7	11.9			
4/1836	9.4	11.5			
5/1836	9.6	11.8			
6/1836	9.3	11.4			
7/1836	10.0	11.3			
8/1836	9.3	11.4			
9/1836	9.4	11.5			
10/1836	9.6	11.8			
11/1836	9.2	11.3			

12/1836	8.1	10.0			
1/1837	7.9	9.7	16.7	8.0	9.8
2/1837	8.0	9.9			
3/1837	8.2	10.0			
4/1837	8.0	9.8			
5/1837	8.1	10.0			
6/1837	7.9	9.7			
7/1837	8.4	10.3			
8/1837	8.1	10.0			
9/1837	8.2	10.0			
10/1837	8.3	10.2			
11/1837	8.0	9.8			
12/1837	7.1	8.7			
1/1838	11.6	12.7	17.1	12.1	13.6
2/1838	11.7	12.9			
3/1838	11.9	13.0			
4/1838	11.8	13.0			
5/1838	13.1	14.5			
6/1838	13.6	14.7			
7/1838	12.9	13.9			
8/1838	12.5	13.9			
9/1838	11.7	13.6			
10/1838	11.3	13.7			
11/1838	11.6	13.8			
12/1838	11.8	13.8			
1/1839	10.4	11.1	13.5	11.0	11.6
2/1839	10.1	11.0			
3/1839	9.9	10.8			
4/1839	9.9	10.7			
5/1839	9.8	10.6			
6/1839	9.8	10.6			
7/1839	11.1	11.6			
8/1839	12.4	12.8			
9/1839	12.5	12.7			
10/1839	12.4	12.9			
11/1839	11.5	12.2			
12/1839	12.2	12.5			
1/1840	12.3	11.9	15.9	11.8	11.2
2/1840	12.3	12.0			
3/1840	12.7	11.8			
4/1840	12.4	11.8			
5/1840	12.2	11.1			
6/1840	12.1	10.4			

7/1840	12.0	10.0			
8/1840	12.0	9.6			
9/1840	11.3	10.6			
10/1840	10.6	11.6			
11/1840	10.6	11.6			
12/1840	10.6	11.7			

	Insurance factor	Import tariff				
	All	NY	LIV	HAM	US	UK
	% of price					
1/1827	2.8	37.9	169.1		37.4	156.1
2/1827	2.8	38.6	166.2			
3/1827	2.8	38.2	159.0			
4/1827	2.8	36.9	163.3			
5/1827	2.8	37.4	163.3			
6/1827	2.8	37.9	160.9			
7/1827	2.8	38.5	152.4			
8/1827	2.8	37.5	144.0			
9/1827	2.8	37.5	147.4			
10/1827	2.8	35.4	147.4			
11/1827	2.8	36.2	148.5			
12/1827	2.8	36.3	152.1			
1/1828	2.5	36.3	155.6		36.6	162.9
2/1828	2.5	37.3	159.5			
3/1828	2.5	37.0	159.8			
4/1828	2.5	36.3	162.2			
5/1828	2.5	36.8	162.2			
6/1828	2.5	37.1	169.9			
7/1828	2.5	37.0	171.0			
8/1828	2.5	36.5	171.8			
9/1828	2.5	36.0	168.8			
10/1828	2.5	35.7	159.2			
11/1828	2.5	36.0	156.8			
12/1828	2.5	36.6	158.2			
1/1829	2.0	36.7	158.5		39.1	173.7
2/1829	2.0	37.3	158.5			
3/1829	2.0	38.1	167.6			
4/1829	2.0	38.2	169.5			
5/1829	2.0	39.1	171.8			
6/1829	2.0	39.9	175.0			
7/1829	2.0	40.3	175.8			

8/1829	2.0	39.5	176.2			
9/1829	2.0	39.3	179.6			
10/1829	2.0	39.7	182.2			
11/1829	2.0	40.0	183.9			
12/1829	2.0	40.3	186.2			
1/1830	1.8	40.5	185.3		41.1	187.2
2/1830	1.8	40.5	185.3			
3/1830	1.8	39.1	185.3			
4/1830	1.8	39.3	185.3			
5/1830	1.8	39.9	188.1			
6/1830	1.8	41.9	191.4			
7/1830	1.8	41.8	206.6			
8/1830	1.8	42.0	177.9			
9/1830	1.8	41.4	175.8			
10/1830	1.8	41.4	182.2			
11/1830	1.8	41.9	188.5			
12/1830	1.8	43.4	194.3			
1/1831	2.3	46.3	194.3	0.5	49.7	210.7
2/1831	2.3	49.6	193.8			
3/1831	2.3	51.1	201.1			
4/1831	2.3	46.9	201.1			
5/1831	2.3	49.6	201.1			
6/1831	2.3	49.7	215.4			
7/1831	2.3	51.6	219.8			
8/1831	2.3	51.4	223.7			
9/1831	2.3	50.4	225.0			
10/1831	2.3	49.8	216.0			
11/1831	2.3	50.2	218.5			
12/1831	2.3	50.3	218.5			
1/1832	2.7	50.7	218.5	0.5	42.3	196.6
2/1832	2.7	50.3	211.8			
3/1832	2.7	47.1	212.4			
4/1832	2.7	45.0	184.4			
5/1832	2.7	45.2	186.7			
6/1832	2.7	45.8	195.3			
7/1832	2.7	38.2	193.4			
8/1832	2.7	38.1	185.3			
9/1832	2.7	36.9	190.9			
10/1832	2.7	36.7	194.8			
11/1832	2.7	36.6	192.9			
12/1832	2.7	36.8	192.4			
1/1833	2.0	37.0	193.4	0.5	35.0	189.1
2/1833	2.0	38.3	194.8			

3/1833	2.0	37.6	194.8			
4/1833	2.0	36.6	212.1			
5/1833	2.0	36.0	210.9			
6/1833	2.0	35.9	200.8			
7/1833	2.0	35.8	200.8			
8/1833	2.0	35.1	191.4			
9/1833	2.0	29.2	159.8			
10/1833	2.0	29.4	163.3			
11/1833	2.0	33.6	166.9			
12/1833	2.0	35.0	179.8			
1/1834	1.7	35.3	187.8	0.5	36.9	192.7
2/1834	1.7	36.5	190.9			
3/1834	1.7	35.8	189.0			
4/1834	1.7	37.2	195.9			
5/1834	1.7	38.6	195.9			
6/1834	1.7	38.6	206.0			
7/1834	1.7	38.9	196.1			
8/1834	1.7	37.2	196.1			
9/1834	1.7	36.6	193.8			
10/1834	1.7	36.3	184.8			
11/1834	1.7	35.9	189.9			
12/1834	1.7	35.9	186.7			
1/1835	1.7	36.0	184.6	0.5	33.1	176.1
2/1835	1.7	36.0	182.8			
3/1835	1.7	35.0	184.4			
4/1835	1.7	33.3	192.4			
5/1835	1.7	33.6	188.5			
6/1835	1.7	33.8	185.7			
7/1835	1.7	32.0	184.6			
8/1835	1.7	31.5	167.8			
9/1835	1.7	32.0	162.6			
10/1835	1.7	31.4	162.6			
11/1835	1.7	31.0	159.2			
12/1835	1.7	31.0	157.8			
1/1836	1.7	30.4	160.9	0.5	29.1	150.1
2/1836	1.7	29.8	160.3			
3/1836	1.7	25.9	162.2			
4/1836	1.7	24.8	164.9			
5/1836	1.7	25.7	160.7			
6/1836	1.7	29.4	160.8			
7/1836	1.7	29.4	138.6			
8/1836	1.7	29.0	138.6			
9/1836	1.7	28.6	136.5			

10/1836	1.7	29.2	138.6			
11/1836	1.7	31.8	139.5			
12/1836	1.7	35.4	139.5			
1/1837	1.7	36.0	165.5	0.5	36.6	171.6
2/1837	1.7	35.4	170.4			
3/1837	1.7	32.7	173.7			
4/1837	1.7	35.5	177.6			
5/1837	1.7	40.1	177.6			
6/1837	1.7	40.7	177.6			
7/1837	1.7	40.2	174.7			
8/1837	1.7	37.4	177.9			
9/1837	1.7	37.5	175.6			
10/1837	1.7	37.5	170.6			
11/1837	1.7	32.9	165.9			
12/1837	1.7	32.7	151.9			
1/1838	1.6	36.1	154.1	0.5	35.9	169.4
2/1838	1.6	34.3	158.0			
3/1838	1.6	35.5	156.1			
4/1838	1.6	37.0	167.5			
5/1838	1.6	38.0	178.1			
6/1838	1.6	39.0	175.1			
7/1838	1.6	38.7	173.2			
8/1838	1.6	36.8	173.2			
9/1838	1.6	34.8	173.2			
10/1838	1.6	34.3	183.3			
11/1838	1.6	33.2	176.1			
12/1838	1.6	32.8	164.8			
1/1839	1.7	37.4	162.9	0.5	36.5	154.5
2/1839	1.7	36.2	160.4			
3/1839	1.7	35.0	154.9			
4/1839	1.7	35.9	156.3			
5/1839	1.7	36.0	156.2			
6/1839	1.7	36.5	146.8			
7/1839	1.7	36.5	147.5			
8/1839	1.7	36.6	151.6			
9/1839	1.7	36.6	149.4			
10/1839	1.7	36.2	153.4			
11/1839	1.7	36.7	157.4			
12/1839	1.7	38.6	157.2			
1/1840	1.7	42.9	158.8	0.5	41.2	137.6
2/1840	1.7	41.2	152.7			
3/1840	1.7	43.2	149.8			
4/1840	1.7	43.4	156.4			

5/1840	1.7	43.5	144.3			
6/1840	1.7	43.7	130.2			
7/1840	1.7	43.2	105.1			
8/1840	1.7	41.4	106.5			
9/1840	1.7	39.1	104.2			
10/1840	1.7	37.9	108.3			
11/1840	1.7	37.2	165.9			
12/1840	1.7	37.3	168.9			

	Market potential				
	NY	LIV	HAM	US	UK
1/1827	19.0	6.2		24.6	12.1
2/1827	18.7	6.8			
3/1827	18.9	7.4			
4/1827	19.1	6.4			
5/1827	20.4	7.9			
6/1827	18.5	8.4			
7/1827	18.2	8.0			
8/1827	16.7	8.3			
9/1827	16.0	8.5			
10/1827	17.7	7.9			
11/1827	14.7	7.6			
12/1827	15.8	7.7			
1/1828	20.0	6.6		24.7	12.0
2/1828	19.4	7.0			
3/1828	20.4	7.3			
4/1828	20.0	7.6			
5/1828	19.6	8.2			
6/1828	19.8	8.3			
7/1828	18.5	8.1			
8/1828	17.6	8.1			
9/1828	17.3	7.4			
10/1828	17.1	8.0			
11/1828	17.1	6.9			
12/1828	17.1	6.9			
1/1829	20.2	6.7		24.3	11.6
2/1829	19.7	7.6			
3/1829	21.9	7.1			
4/1829	20.8	8.0			
5/1829	19.2	8.1			
6/1829	18.7	7.6			

7/1829	17.9	8.1			
8/1829	18.0	7.6			
9/1829	15.8	7.5			
10/1829	17.0	6.4			
11/1829	16.6	5.6			
12/1829	14.9	6.6			
1/1830	15.1	5.7		24.2	11.2
2/1830	16.8	7.3			
3/1830	19.5	6.8			
4/1830	20.1	7.0			
5/1830	20.1	7.5			
6/1830	19.5	6.8			
7/1830	18.1	7.5			
8/1830	18.9	7.8			
9/1830	18.2	7.6			
10/1830	18.9	6.8			
11/1830	18.3	6.6			
12/1830	19.0	6.2			
1/1831	15.4	6.0	49.3	21.0	10.5
2/1831	16.5	7.2			
3/1831	16.6	6.2			
4/1831	17.0	6.8			
5/1831	17.7	7.3			
6/1831	16.1	7.4			
7/1831	16.8	6.8			
8/1831	15.2	6.5			
9/1831	14.2	6.8			
10/1831	14.5	5.8			
11/1831	13.7	4.9			
12/1831	15.3	6.3			
1/1832	15.0	5.9	63.7	23.1	10.9
2/1832	14.2	6.6			
3/1832	17.5	5.5			
4/1832	18.6	7.2			
5/1832	19.4	6.4			
6/1832	17.8	7.7			
7/1832	19.2	6.9			
8/1832	17.0	7.9			
9/1832	16.7	7.4			
10/1832	16.6	6.2			
11/1832	16.8	7.0			
12/1832	15.0	6.8			
1/1833	18.6	6.4	61.9	27.4	11.1

2/1833	18.3	6.7			
3/1833	20.0	7.1			
4/1833	21.5	6.9			
5/1833	23.0	7.3			
6/1833	20.7	7.6			
7/1833	21.4	6.9			
8/1833	20.6	7.6			
9/1833	23.8	7.1			
10/1833	24.8	6.7			
11/1833	18.7	7.1			
12/1833	15.5	7.1			
1/1834	18.0	6.7	65.5	27.4	11.0
2/1834	20.2	7.4			
3/1834	22.2	6.5			
4/1834	21.5	6.7			
5/1834	21.2	7.4			
6/1834	21.5	7.3			
7/1834	20.1	6.9			
8/1834	20.4	7.1			
9/1834	20.7	7.6			
10/1834	18.8	7.3			
11/1834	18.7	5.4			
12/1834	19.3	7.5			
1/1835	20.8	7.0	70.6	28.8	11.5
2/1835	19.8	7.1			
3/1835	22.5	7.4			
4/1835	25.0	7.0			
5/1835	23.0	8.1			
6/1835	22.8	7.8			
7/1835	22.1	7.5			
8/1835	22.8	7.7			
9/1835	21.5	8.5			
10/1835	20.7	7.3			
11/1835	21.1	7.1			
12/1835	21.2	8.0			
1/1836	19.2	7.6	67.3	33.5	12.8
2/1836	21.2	7.8			
3/1836	27.4	8.3			
4/1836	29.8	8.0			
5/1836	29.1	7.8			
6/1836	26.2	8.8			
7/1836	25.6	9.4			
8/1836	24.9	8.4			

9/1836	25.9	9.5			
10/1836	23.1	8.3			
11/1836	22.7	8.5			
12/1836	21.6	8.3			
1/1837	19.1	7.6	59.8	28.7	11.8
2/1837	20.3	7.8			
3/1837	24.0	7.5			
4/1837	24.2	8.0			
5/1837	22.3	7.7			
6/1837	20.7	8.5			
7/1837	19.0	7.5			
8/1837	20.9	7.8			
9/1837	20.5	6.9			
10/1837	19.3	7.5			
11/1837	22.2	7.4			
12/1837	22.1	8.2			
1/1838	17.8	8.1	59.8	27.4	11.9
2/1838	18.4	7.6			
3/1838	22.1	8.3			
4/1838	22.5	8.0			
5/1838	21.0	7.2			
6/1838	19.6	8.3			
7/1838	19.8	7.8			
8/1838	21.2	8.2			
9/1838	21.3	7.8			
10/1838	20.4	7.1			
11/1838	20.8	5.8			
12/1838	20.3	7.6			
1/1839	18.5	7.6	70.9	28.3	12.5
2/1839	21.2	7.5			
3/1839	23.8	8.5			
4/1839	23.2	7.6			
5/1839	23.2	8.0			
6/1839	22.8	9.3			
7/1839	21.6	8.6			
8/1839	21.1	8.3			
9/1839	19.8	8.3			
10/1839	19.1	7.7			
11/1839	16.2	7.7			
12/1839	16.6	7.4			
1/1840	17.8	8.3	62.9	24.8	13.3
2/1840	18.6	7.4			
3/1840	18.9	7.1			

4/1840	19.2	8.4			
5/1840	19.0	8.5			
6/1840	19.9	7.9			
7/1840	19.0	9.3			
8/1840	18.3	8.9			
9/1840	19.2	9.8			
10/1840	20.1	9.4			
11/1840	20.3	6.8			
12/1840	19.8	7.6			

5.5. Total export (in metric tons) of coffee from the port of Rio de Janeiro, original and counterfactual estimates, 1827-1840.

	Original	A	B	C	D
1827	22358	22358	22358	22358	22358
1828	24639	24639	24639	24639	24639
1829	27741	27741	27741	27741	27741
1830	29684	29684	29684	28012	26531
1831	30619	30619	30619	28271	26728
1832	34809	33751	32411	27472	26969
1833	42165	33824	35306	28245	27490
1834	39554	35178	36113	29398	28066
1835	45967	36073	36919	30091	28642
1836	52041	37149	37725	30965	29218
1837	46270	35196	27805	28811	19067
1838	57352	46930	39338	40344	30370
1839	63772	48513	40145	41725	30946
1840	77841	66336	40951	59346	31522